NMEA Translator UMDF filter driver

For USB NMEA 0183 capable devices

This filter driver has the capability of rewriting NMEA Talker IDs in the incoming NMEA messages from USB serial device.

A Talker ID is a two-character prefix that identifies the type of the transmitting unit. By far the most common talker ID is **GP**, identifying a generic GPS. Some of the Talker IDs made obsolete by newer revisions of the standard may still be emitted by older devices and some new Talker IDs may not yet be supported by older software. Hence the need for such tool, giving you the possibility to translate incoming NMEA messages, making the connection between hardware and software that works for you.

**Supported OS**: Windows 7 SP1 and later (32bit / 64bit)
Tested USB drivers: usbser.sys, silabser.sys

Overview

- This is a filter driver working on top of the vendor-supplied device-specific driver that should be already present in your system.

- You will need to inspect the properties of the vendor-supplied driver (*filename* and *hardware ID*) and change the NMEA Translator UMDF inf file accordingly.

- For the already tested devices, working inf files are available in the repo. You are always welcome to submit your own.

Installing the driver

- Connect your NMEA compatible **USB device** to your PC

- Inspect your NMEA compatible USB device in the **Device Manager** (under the Ports (COM & LPT) node) and note down its driver filename (in Driver details on Driver tab) and hardware IDs (on the Details tab) from its Properties
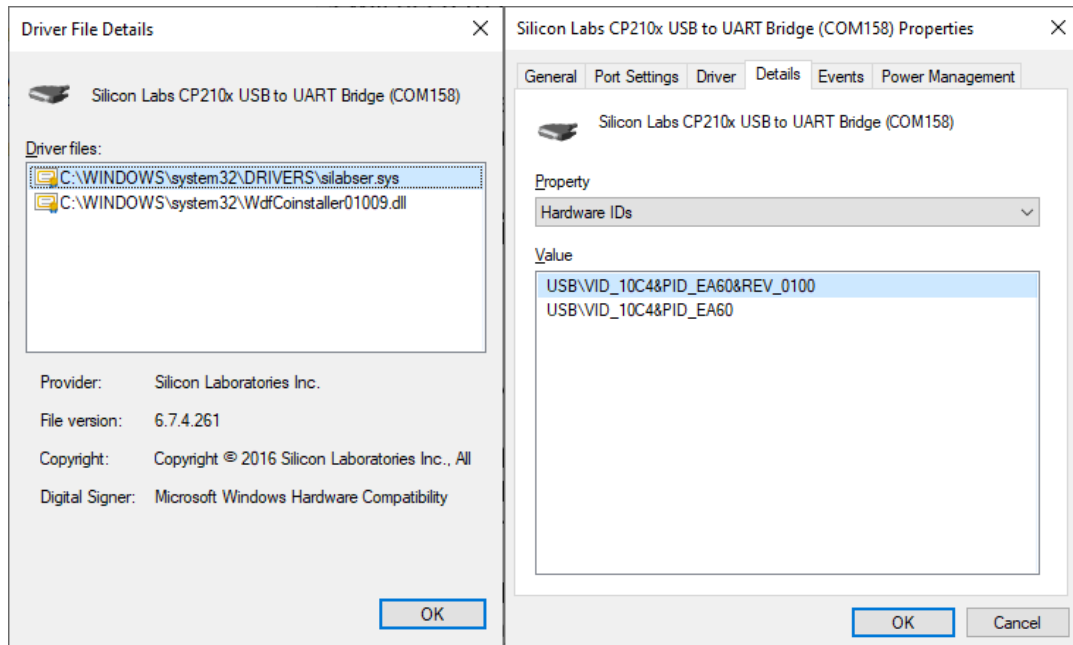
- Download the **NMEA Translator Driver** package from https://github.com/arctowski/NMEAtranslator/tree/master/Binaries appropriate for your driver and architecture or build a new driver package (instructions below)

- Check **NMEATranslatorUMDF.inf** if the hardware ID in line 19 and driver filename in line 83 match the details of your driver.
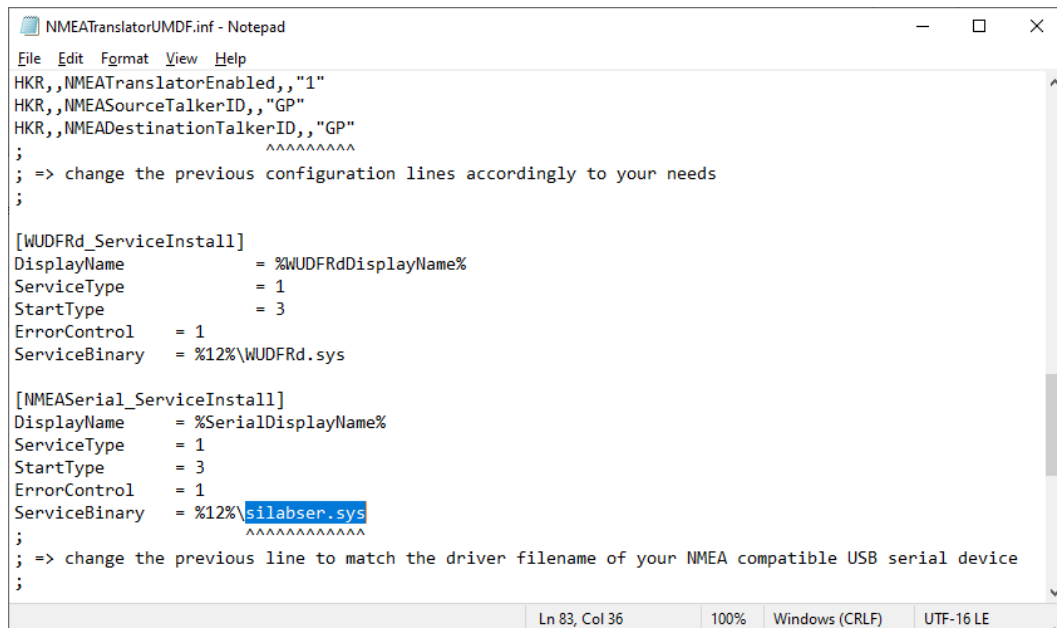
```
NMEATranslatorUMDF.inf - Notepad                                    —   □   ×

File  Edit  Format  View  Help
HKR,,NMEATranslatorEnabled,,"1"
HKR,,NMEASourceTalkerID,,"GP"
HKR,,NMEADestinationTalkerID,,"GP"
;                      ^^^^^^^^^^
; => change the previous configuration lines accordingly to your needs
;

[WUDFRd_ServiceInstall]
DisplayName          = %WUDFRdDisplayName%
ServiceType          = 1
StartType            = 3
ErrorControl         = 1
ServiceBinary        = %12%\WUDFRd.sys

[NMEASerial_ServiceInstall]
DisplayName     = %SerialDisplayName%
ServiceType     = 1
StartType       = 3
ErrorControl    = 1
ServiceBinary   = %12%\silabser.sys
;                      ^^^^^^^^^^^^
; => change the previous line to match the driver filename of your NMEA compatible USB serial device
;

                                  Ln 83, Col 36    100%   Windows (CRLF)   UTF-16 LE
```
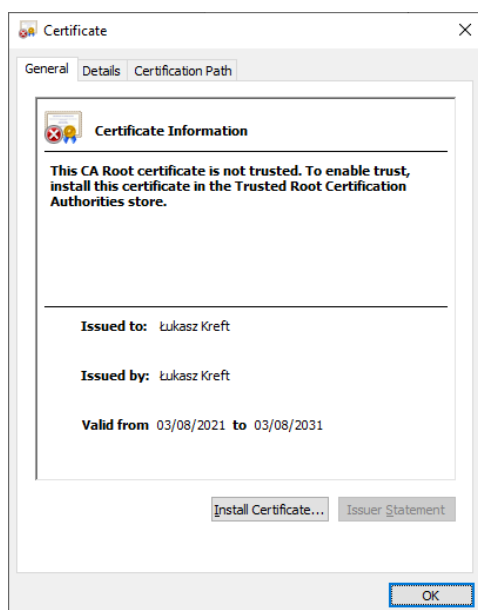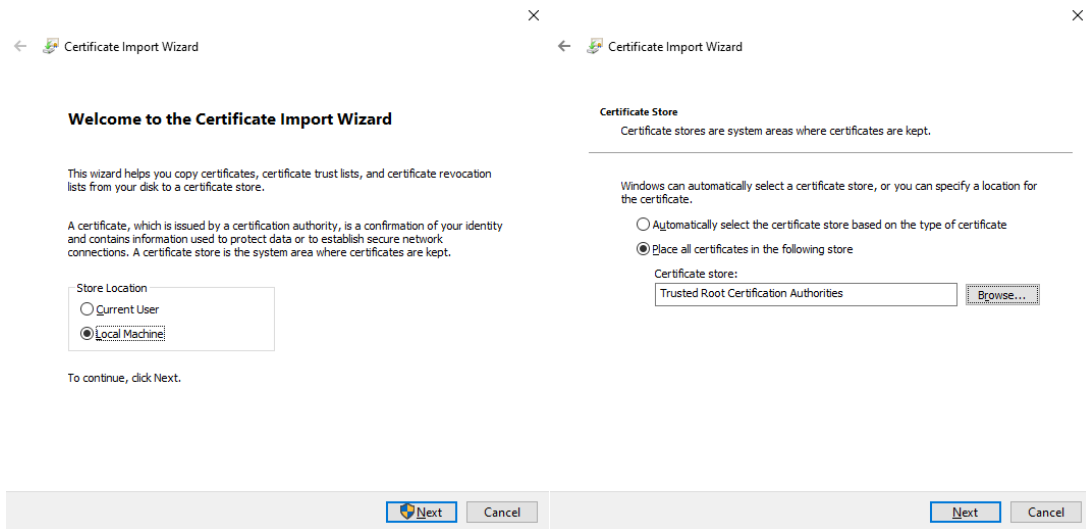
- Since our driver is signed by ourselves you will need to install it on your PC. Double click on **NMEATranslatorPackage.cer** and choose **Install Certificate**. Under Store Location select Local Machine, hit Next and select Place all the selected certificates in the following store, browse to Trusted Root Certification Authorities, followed by clicking on Next. Check the summary screen and hit Finish. The import should be confirmed by *The import was successful* message.


```
Certificate                                    ×

General  Details  Certification Path

    Certificate Information

    This CA Root certificate is not trusted. To enable trust,
    install this certificate in the Trusted Root Certification
    Authorities store.


    Issued to:  Łukasz Kreft

    Issued by:  Łukasz Kreft

    Valid from  03/08/2021  to  03/08/2031


              Install Certificate...    Issuer Statement

                                              OK
```
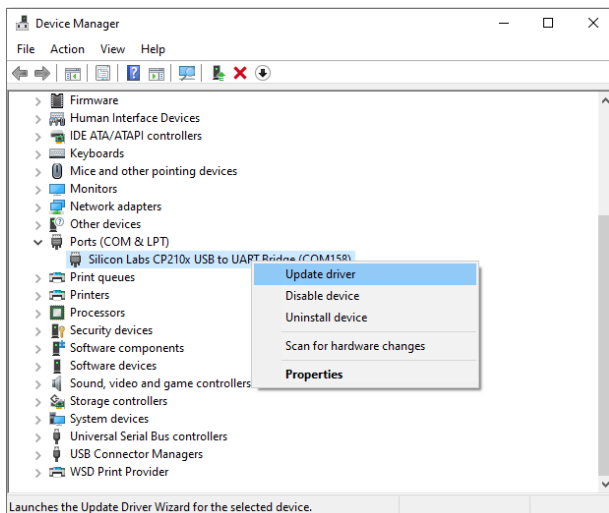
- Right click on the **NMEATranslatorUMDF.inf** file and choose **Install**. A Windows Security prompt will be displayed. Choose Install. Wait for *The operation completed successfully* message.
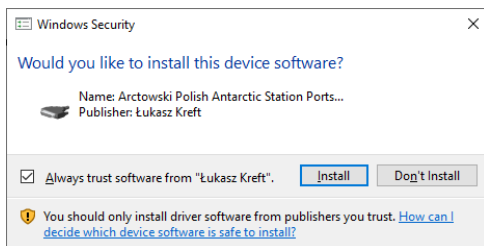
- In the Device Manager, right click on your NMEA compatible USB device and choose **Update driver**. In the following prompts choose Browse my computer for drivers and 'Let me pick from a list of available driver on my computer. On the compatible drivers list there should be NMEA Translator Driver entry, select it and hit Next. Wait for the update process to finish and close the window. You should see the name of the device changed to NMEA Translator Driver alongside its COM port number.

×

← 📱 Update Drivers – Silicon Labs CP210x USB to UART Bridge (COM158)

How do you want to search for drivers?

→ Search automatically for drivers
Windows will search your computer for the best available driver and install it on your device.

→ Browse my computer for drivers
Locate and install a driver manually.

Cancel

×

← 📱 Update Drivers – Silicon Labs CP210x USB to UART Bridge (COM158)

Browse for drivers on your computer

Search for drivers in this location:

Z:\   ▾   Browse...

☑ Include subfolders

→ Let me pick from a list of available drivers on my computer
This list will show available drivers compatible with the device, and all drivers in the same category as the device.

Next   Cancel

×

← 📱 Update Drivers – Silicon Labs CP210x USB to UART Bridge (COM158)

Select the device driver you want to install for this hardware.

Select the manufacturer and model of your hardware device and then click Next. If you have a disk that contains the driver that you want to install, click Have Disk.

☑ Show compatible hardware

Model
💻 NMEA Translator Driver
💻 Silicon Labs CP210x USB to UART Bridge

💻 This driver has an Authenticode(tm) signature.   Have Disk...
Tell me why driver signing is important

Next   Cancel

→ Search automatically for drivers
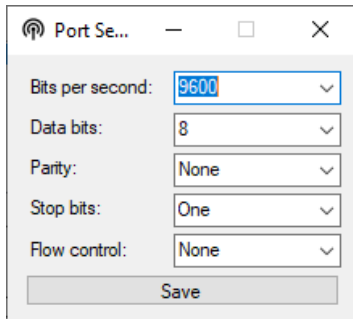
Using the driver

- The moment you have installed the NMEA Translator Driver it is active and ready to be used

- Connect your software to the NMEA Translator Driver using its COM port number as usual for your original device

- You can inspect the NMEA messages and configure the driver properties using the dedicated NMEA Translator companion app

Using the driver companion app

- NMEA Translator Driver companion app lets you monitor NMEA messages sent by your device, enable or disable the translator as well as configure the source and destination Talker IDs on the fly

- In order to run NMEA Translator Driver .NET Framework v4.6.1 (or later) is required. It is already pre-installed in Windows 10 v1511 (or later). Should you need to install it, you can download it from https://dotnet.microsoft.com/download/dotnet-framework/thank-you/net461-web-installer

- You can run the NMEA Translator Driver companion app by double clicking the **NMEATranslator.exe**. It will require administrator rights in order to set NMEA Translator driver properties correctly

- Under Available devices you will see the list of USB serial devices currently connected to your PC. If you have just connected your device, hit on **Refresh** button to rescan COM ports
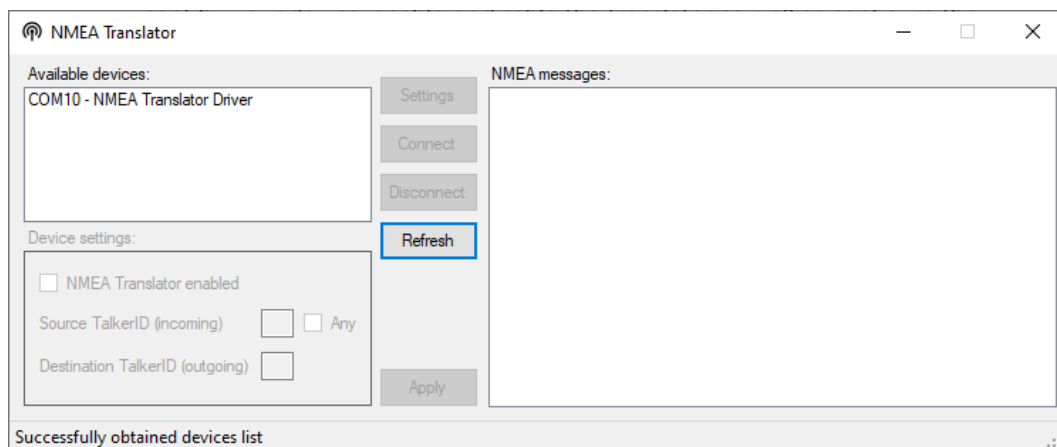
- You can connect to any of the listed devices by clicking on **Connect** button. Any incoming serial communication will appear in NMEA messages list box. If you need to change any of the default serial connection parameters you can find them under **Settings** button
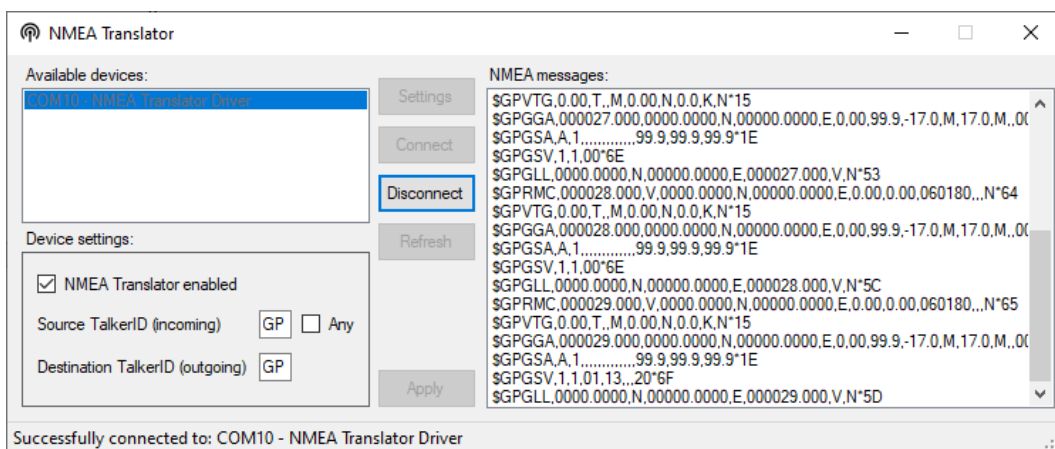
- For devices using the NMEA Translator Driver, the Device settings box will be enabled allowing you to set the translator parameters, like dedicated source Talker ID to translate from (or any if you want to translate all) and destination Talker ID to translate to. Once you hit the **Apply** button, the settings will be saved in the registry for this device. If you have been already connected to that device you will be automatically reconnected to it with new settings in place.
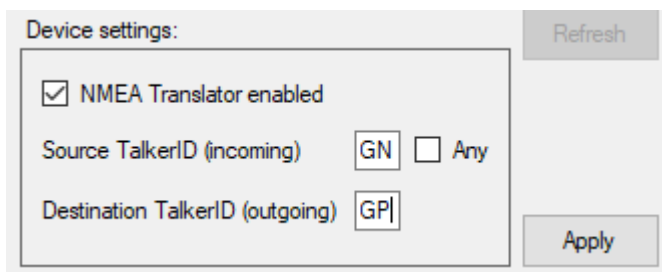
Building the driver from source

- If you want you can build the driver from source, test it and develop it further

- You will need Git and Visual Studio 2019 with Windows Driver Kit and with C++ and .NET desktop development workloads.

- Clone this repository and open the driver solution in Visual Studio (double click on **NMEATranslator.sln**).

- Edit **NMEATranslatorUMDF.inx** to add support for a new NMEA compatible USB device vendor driver

- Right-click the NMEATranslatorPackage under Package folder in the Solutions Explorer and select Build to build the NMEA Translator UMDF driver code.

- Right-click the NMEATranslator under App folder in the Solutions Explorer and select Build to build the NMEA Translator companion app code.

Contents

Folder	Description
App	Source code for the NMEA Translator driver companion app.
Binaries	Binaries of NMEA Translator Driver and App
Package	Source code for driver packaging.
UMDF	Source code for the NMEA Translator UMDF filter driver

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