

nRF Connect Trace Collector

v1.0.7

User Guide

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Revision history

Date	Description
2022-02-21	Updated: <ul style="list-style-type: none"><li>• Updating the board controller firmware on page 8<li>• Enabling tracing in the application on page 8
2021-07-07	Updated Updating the board controller firmware on page 8
2021-04-23	First release

1 Introduction

nRF Connect Trace Collector is a cross-platform tool to capture trace files of the nRF9160 modem.

The tool collects *Universal Asynchronous Receiver/Transmitter (UART)* traces from the nRF9160 *System in Package (SiP)* over the serial port. If you run into problems when developing and debugging your application, Nordic Semiconductor's support team might ask you to provide these binary trace files to analyze the communication between the device and the LTE network.

The Trace Collector is implemented as an app for the [nRF Connect for Desktop](#) application.

Supported devices

- nRF9160 DK (PCA10090)
- Nordic Thingy:91™ (PCA20035)

2 Installing the Trace Collector

The Trace Collector is installed as an app for nRF Connect for Desktop.

Before you can install the Trace Collector, you must download and install [nRF Connect for Desktop](#).

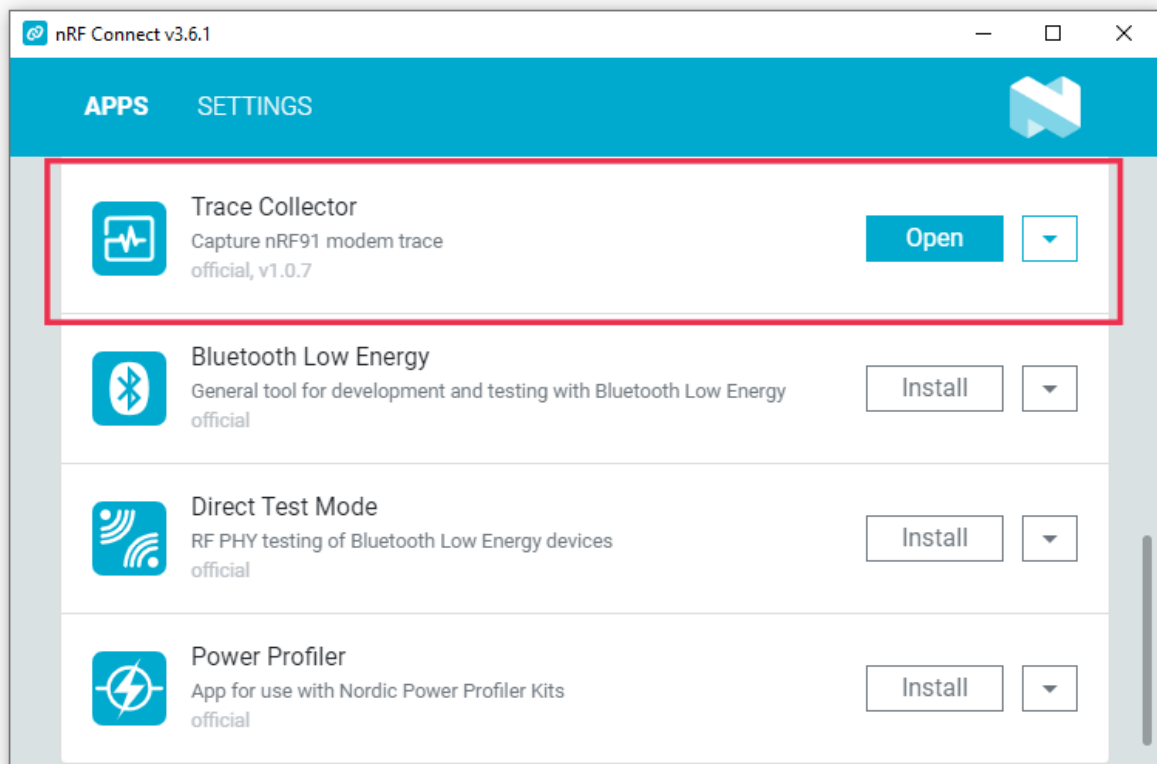
To install the Trace Collector:

1. Open nRF Connect for Desktop.
2. Find the Trace Collector in the list of apps and click **Install**.

Once the app is installed, you can launch it by clicking **Open**.

For easy access, you can create a desktop shortcut by clicking the **arrow down** button and selecting **Create shortcut**.

If a new version of the app becomes available, an **Update** button is displayed next to the **Open** button. Click this button to install the latest version. To uninstall the app, click the **arrow down** button and select **Uninstall**.



3 Trace Collector overview

After starting the Trace Collector, the application window is displayed.

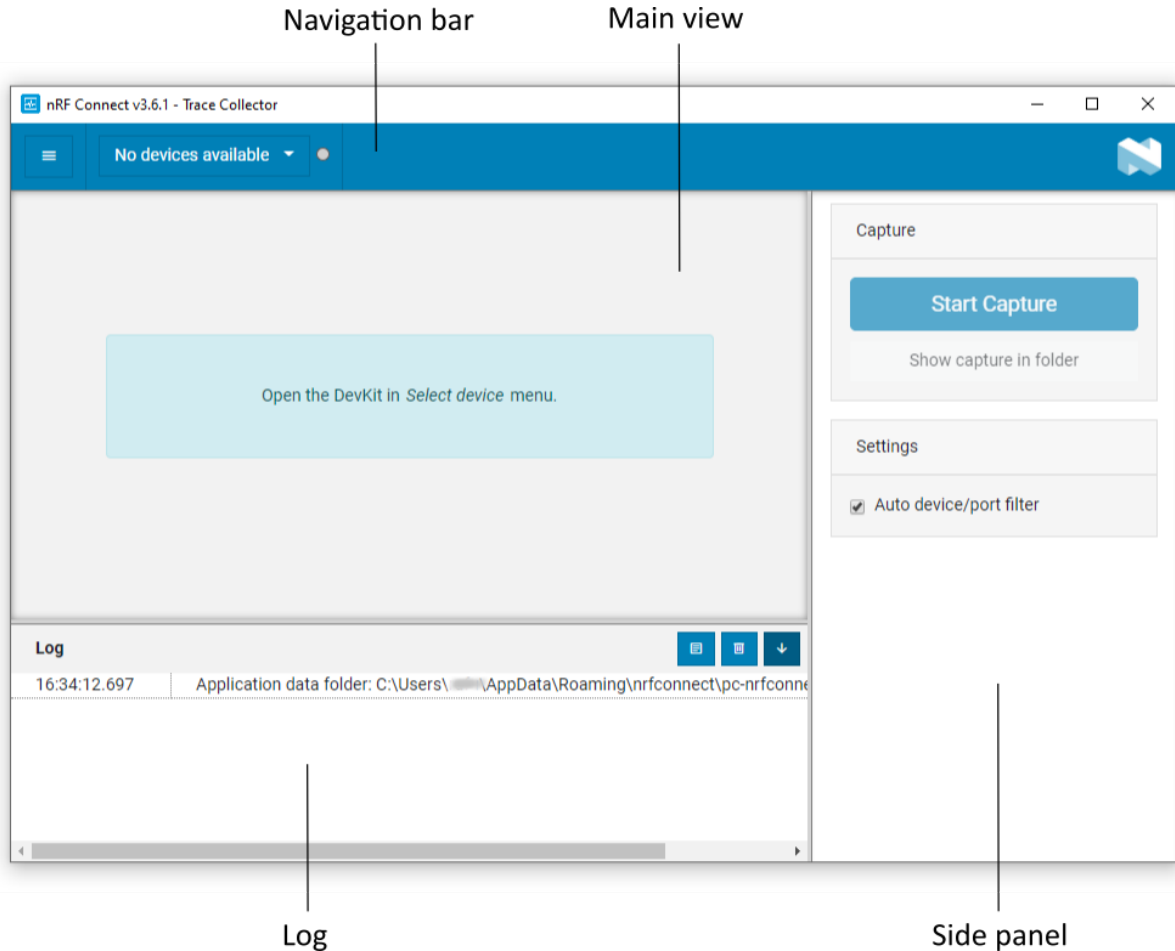


Figure 1: Main window of the Trace Collector app

The main window contains the following elements:

Navigation bar

In the navigation bar, you can access the menu and select a device.

Click the three-dash button in the top-left corner to view information about the app, create a system report, or launch another app.

Once you connect a device to the system, it becomes visible and available when you click on the **Select device** drop-down list.

Main view

The main view is initially empty. When you select a device and start capturing, it displays information about the available disk space and the current trace file.

Side panel

The side panel lets you start capturing, and you can access the captured logs.

You can also configure the Trace Collector to automatically filter the connected devices to display only suitable devices and ports.

Note: If you want to capture from Nordic Thingy:91, deselect **Auto device/port filter** so that you can select the correct port.

Log

The log view shows the most important log events, tagged with a time stamp. Click the **Open log file** button to view the full log file.

4

Collecting a modem trace for the nRF9160 DK

To collect a modem trace, you must ensure that you have the latest firmware for the board controller, update your application to enable tracing, and capture the trace while your application is running.

4.1 Updating the board controller firmware

The Trace Collector requires a current version of the board controller firmware to be programmed on the nRF52840 *System on Chip (SoC)* of the nRF9160 DK.

Download the latest firmware from [nRF9160 DK Downloads](#) (scroll down to **Board controller firmware**).

Complete the following steps to program the board controller firmware:

1. Set the switch that configures which chip to program to the **nRF52** position.
This switch is labeled **PROG/DEBUG (SW10)** on nRF9160 DK v0.15.0 and later, **SW5** on earlier versions).
2. Connect your device to the computer with a *Universal Serial Bus (USB)* cable and power it on, or reset it if it is already connected.
3. Program the downloaded firmware to your device.
 - To program the firmware with nRF Connect Programmer, follow the instructions in [Programming applications on nRF9160 DK](#).
 - To program from the command line, open a terminal window in the directory that contains the downloaded firmware and enter the following command (replace *filename.hex* with the file name of the downloaded firmware image):

```
nrfjprog --program filename.hex --sectorerase -f NRF52 -r --verify
```

Note: The `nrfjprog` tool, which is part of the [nRF Command Line Tools](#), must be installed and in the path.

4.2 Enabling tracing in the application

To be able to capture a modem trace, you must configure your application to enable trace output over *UART*.

The following instructions assume that your application is based on the [nRF Connect SDK](#).

Note: By default, nRF Connect SDK's modem library uses the UART1 peripheral for trace output. This means that you cannot use UART1 for other purposes in your application. If this does not work for your application, you must update the configuration and code of the modem library to use a different UART peripheral for trace output.

Complete the following steps to enable tracing:

1. Set the `CONFIG_NRF_MODEM_LIB_TRACE_ENABLED` option in your application.
See [Configuring your application](#) for instructions on how to set this option temporarily or permanently.

Note:

- In nRF Connect SDK versions before 1.5.0, the option was called `CONFIG_BSD_LIBRARY_TRACE_ENABLED`.
- In nRF Connect SDK v1.5.x, setting the option temporarily might cause a build error. In that case, set the option permanently in the `prj.conf` file.

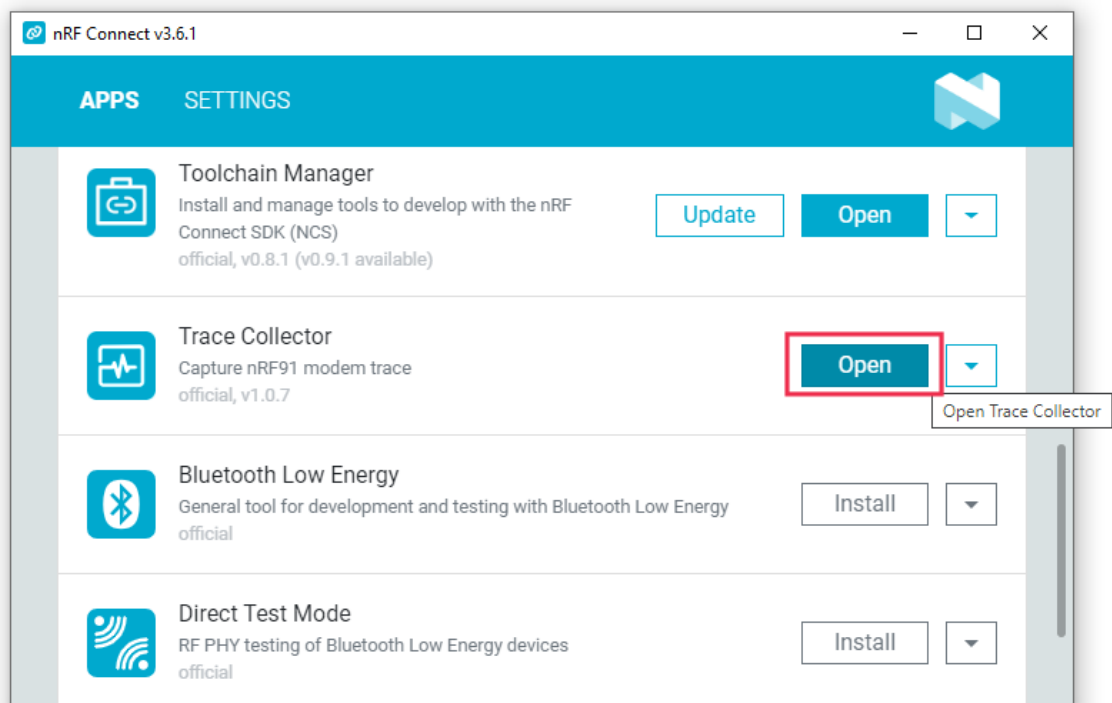
2. Set the switch that configures which chip to program to the **nRF91** position.
This switch is labeled **PROG/DEBUG (SW10)** on nRF9160 DK v0.15.0 and later, **SW5** on earlier versions).
3. Connect your device to the computer with a *USB* cable and power it on, or reset it if it is already connected.
4. Build your application and program it to the device.
Follow the instructions in [Building and programming a sample application](#).

4.3 Capturing the modem trace

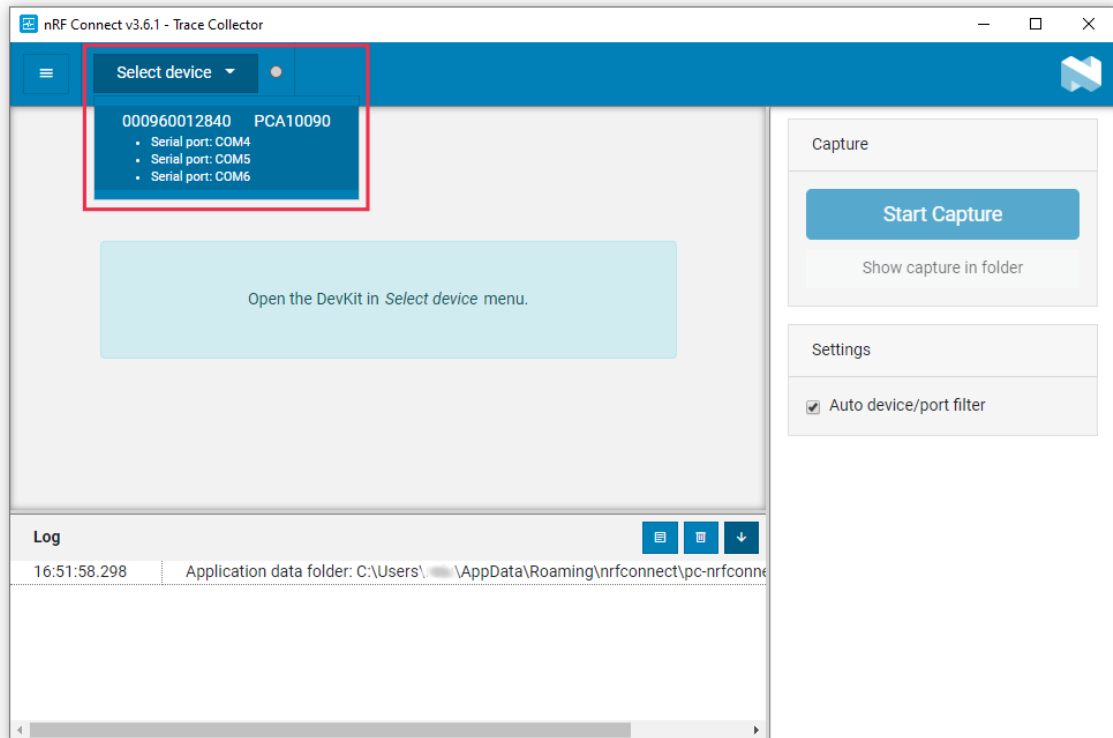
After programming the required firmware, you can use the Trace Collector to capture the modem trace.

Complete the following steps to start capturing:

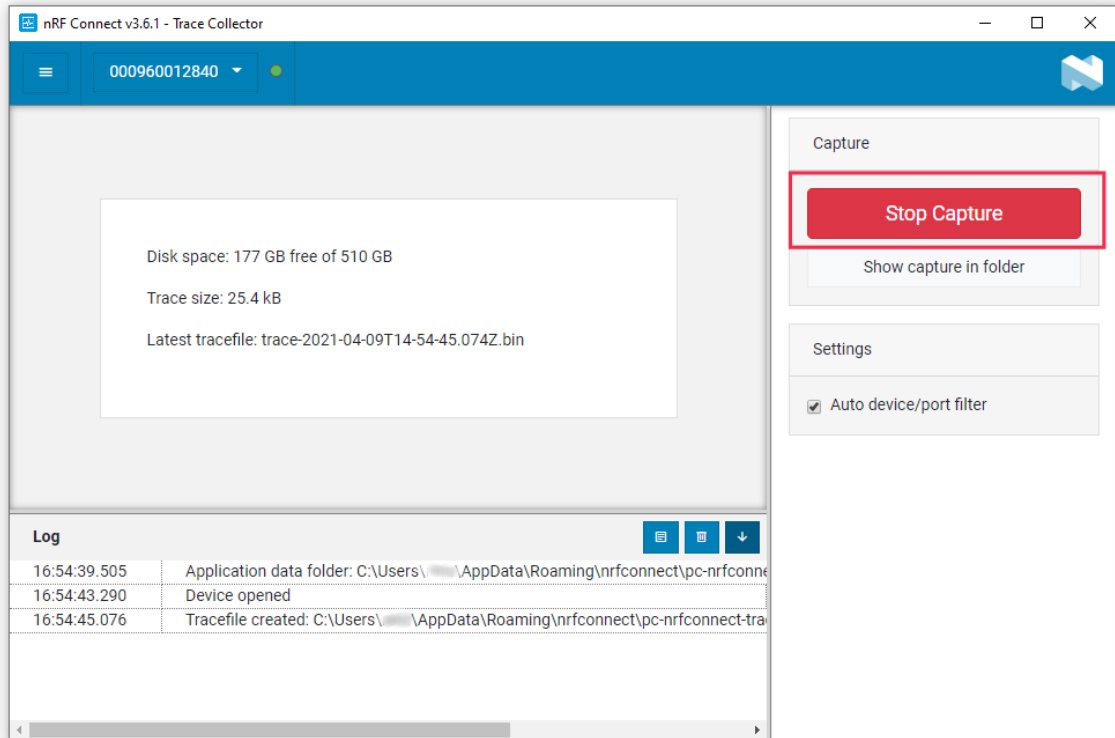
1. Connect your device to the computer with a *USB* cable and power it on, or reset it if it is already connected.
2. Check that your application is working as expected.
3. Open nRF Connect for Desktop and launch the Trace Collector app.



4. Select your device from the drop-down list.



5. Click the **Start Capture** button in the side panel.
You can see the status in the main view. When the modem is active, the size of the trace file should be increasing.
6. Click **Show capture in folder** to access the trace file.
By default, the trace files are stored in `C:\Users\username\AppData\Roaming\nrfconnect\pc-nrfconnect-tracecollector\`.
7. Click **Stop Capture** to stop capturing.



5

Collecting a modem trace for Nordic Thingy:91

To collect a modem trace, you must ensure that you have the latest firmware for the board controller, update your application to enable tracing, and capture the trace while your application is running.

5.1 Updating the board controller firmware

The Trace Collector requires a current version of the board controller firmware to be programmed on the nRF52840 SoC of the Nordic Thingy:91.

Download the latest firmware from [Nordic Thingy:91 Downloads](#) (select **Precompiled application and modem firmware**).

The archive contains images for different applications in different formats. Choose an image based on the method you use to update the firmware:

- When programming through an external debug probe, follow the steps in [Updating firmware through external debug probe](#) to program the nRF52840 SoC.
- When programming through *USB*, follow the steps in [Updating firmware through USB](#) to program the nRF52840 SoC.

5.2 Enabling tracing in the application

To be able to capture a modem trace, you must configure your application to enable trace output over *UART*.

The following instructions assume that your application is based on the [nRF Connect SDK](#).

Note: By default, nRF Connect SDK's modem library uses the UART1 peripheral for trace output. This means that you cannot use UART1 for other purposes in your application. If this does not work for your application, you must update the configuration and code of the modem library to use a different UART peripheral for trace output.

Complete the following steps to enable tracing:

1. Set the `CONFIG_NRF_MODEM_LIB_TRACE_ENABLED` option in your application.

See [Configuring your application](#) for instructions on how to set this option temporarily or permanently.

Note:

- In nRF Connect SDK versions before 1.5.0, the option was called `CONFIG_BSD_LIBRARY_TRACE_ENABLED`.
- In nRF Connect SDK v1.5.x, setting the option temporarily might cause a build error. In that case, set the option permanently in the `prj.conf` file.

2. Build your application and program it to the device.

- When programming through an external debug probe, set the switch that configures which chip to program (**SW2**) to the **nRF91** position and follow the instructions in [Building and programming from the source code](#).

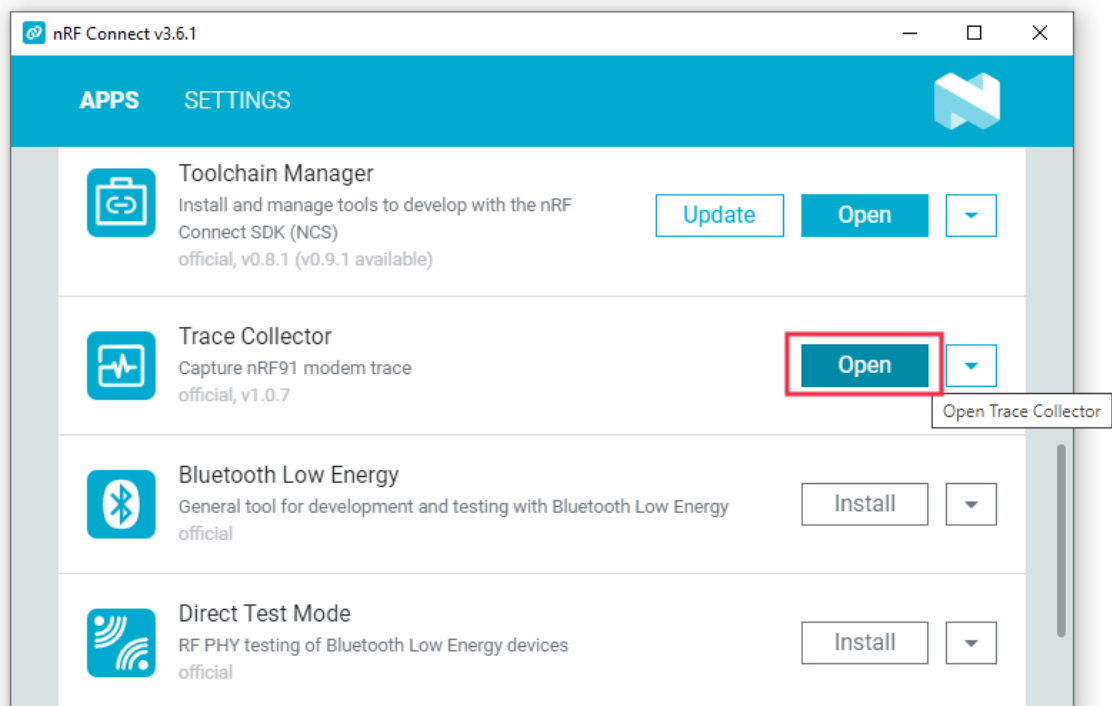
- When programming through *USB*, put the device into application serial recovery mode by pressing and holding the **SW3** button while powering on. Follow the instructions in [Getting started with Thingy:91](#) to program the application.

5.3 Capturing the modem trace

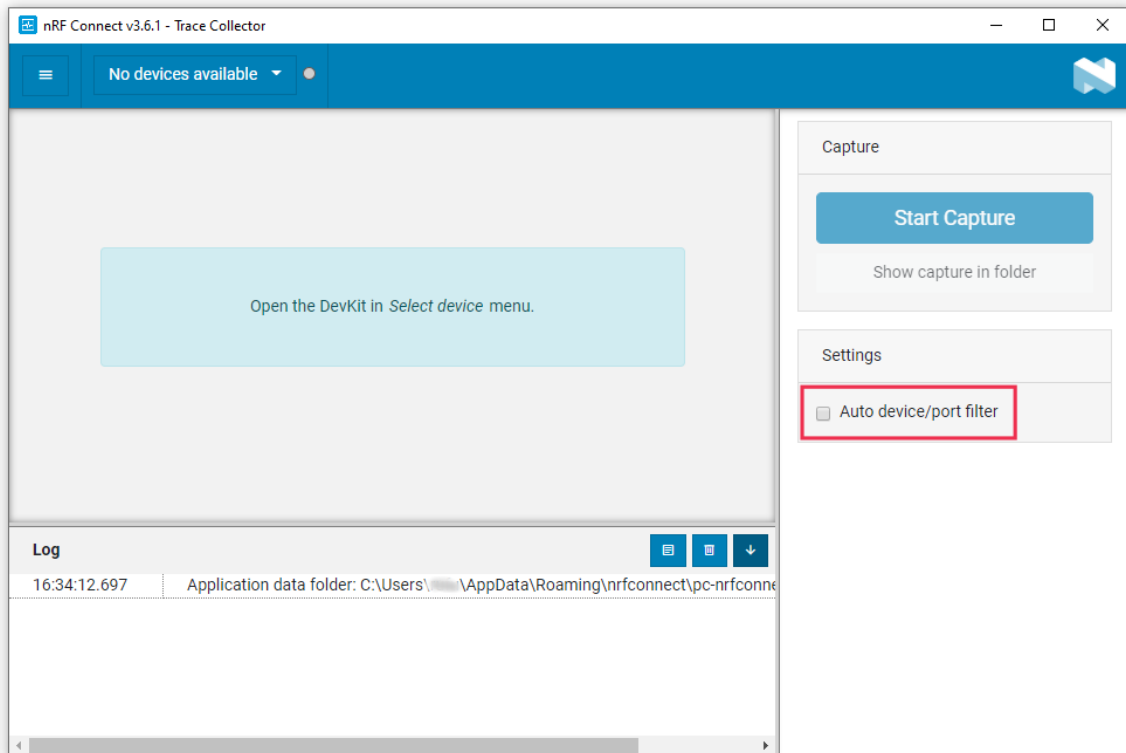
After programming the required firmware, you can use the Trace Collector to capture the modem trace.

Complete the following steps to start capturing:

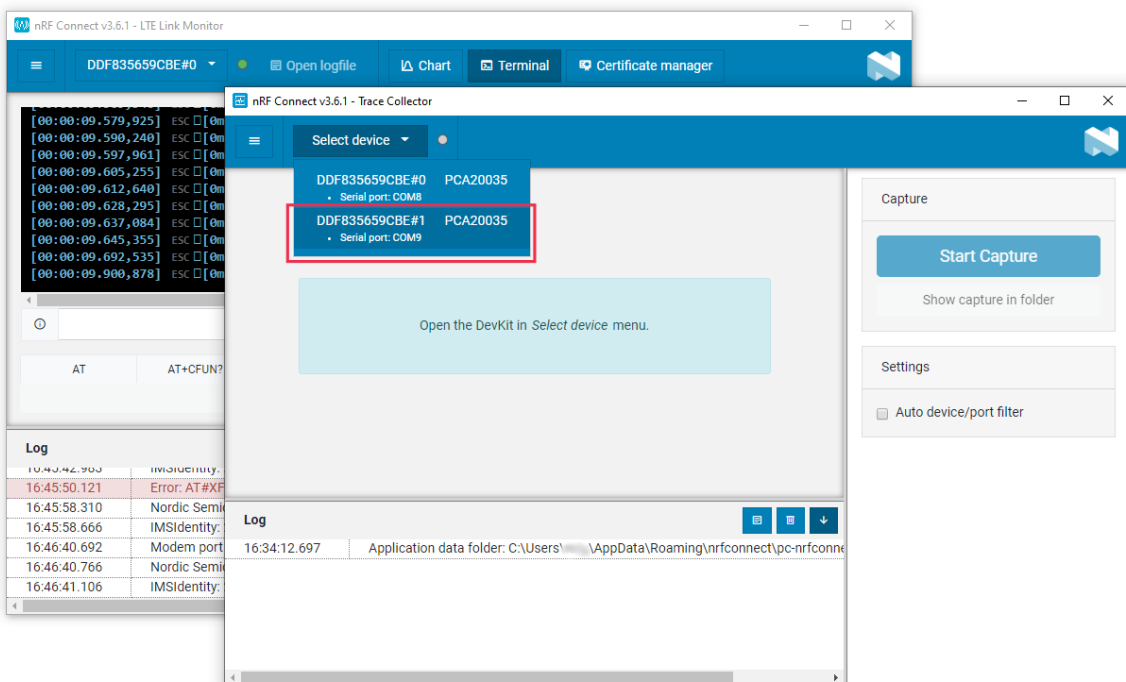
1. Connect your device to the computer with a *USB* cable and power it on, or reset it if it is already connected.
2. Check that your application is working as expected.
3. Open nRF Connect for Desktop and launch the Trace Collector app.



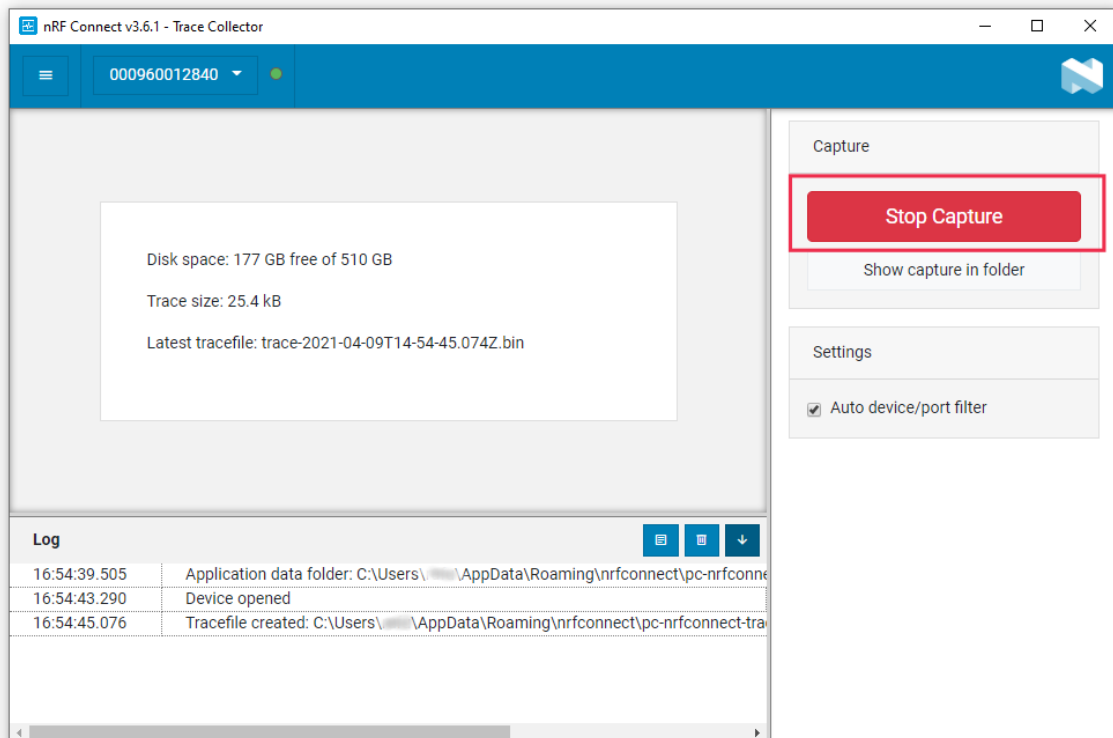
4. Deselect **Auto device/port filter**.



5. Select your device from the drop-down list.
Select the second port. The first one is usually used for the application log.



6. Click the **Start Capture** button in the side panel.
You can see the status in the main view. When the modem is active, the size of the trace file should be increasing.
7. Click **Show capture in folder** to access the trace file.
By default, the trace files are stored in `C:\Users\username\AppData\Roaming\nrfconnect\pc-nrfconnect-tracecollector\`.

8. Click Stop Capture to stop capturing.

Glossary

Development Kit (DK)

A hardware development platform used for application development.

System in Package (SiP)

Several integrated circuits, often from different technologies, enclosed in a single module that performs as a system or subsystem.

System on Chip (SoC)

A microchip that integrates all the necessary electronic circuits and components of a computer or other electronic systems on a single integrated circuit.

Universal Asynchronous Receiver/Transmitter (UART)

A hardware device for asynchronous serial communication between devices.

Universal Serial Bus (USB)

An industry standard that establishes specifications for cables and connectors and protocols for connection, communication, and power supply between computers, peripheral devices, and other computers.

Acronyms and abbreviations

These acronyms and abbreviations are used in this document.

DK

Development Kit

SiP

System in Package

SoC

System on Chip

UART

Universal Asynchronous Receiver/Transmitter

USB

Universal Serial Bus

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