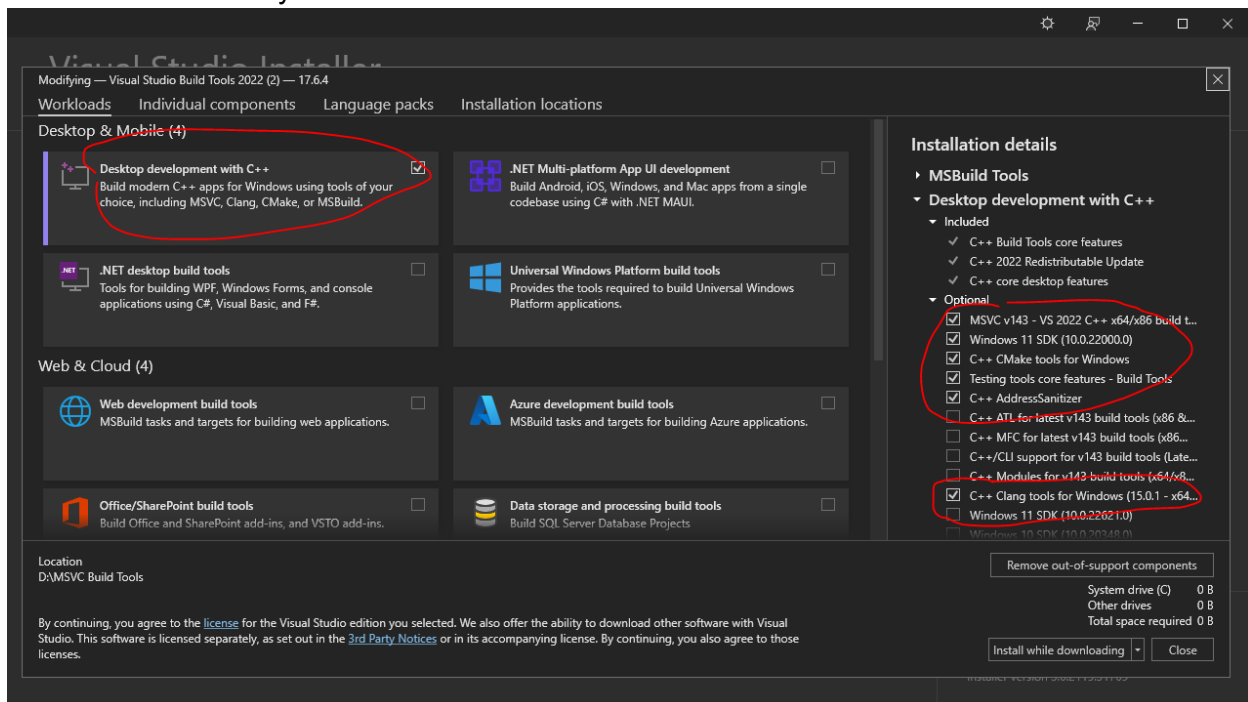# ST25RU3993 Semi-Hosting Setup Guide

Computer Setup

Step 1: Install Dependencies

1. (Windows only) Install MSVC build tools from
   https://aka.ms/vs/17/release/vs_BuildTools.exe
   a. Ensure C++ option is enabled
   b. Make sure "C++ Clang tools for windows" is checked
   c. Note: you DO NOT need the full Visual Studio IDE
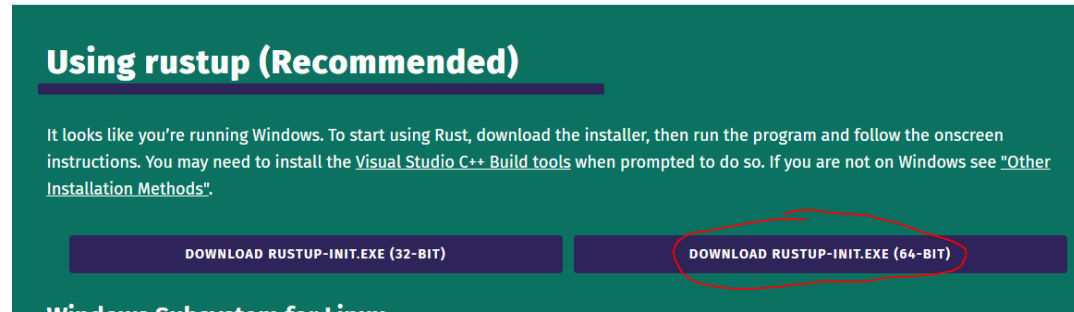

   d. Note: if the compilation still fails you may need to add clang to the path. If this is the case:
      i. Open "environment variables"
      ii. Click "new" on system variables
      iii. Name the variable "LIBCLANG_PATH"
      iv. Set the path to {MSVC_PATH}\VC\Tools\LIvm\x64\bin where MSVC_PATH is wherever you installed the MSVC build tools
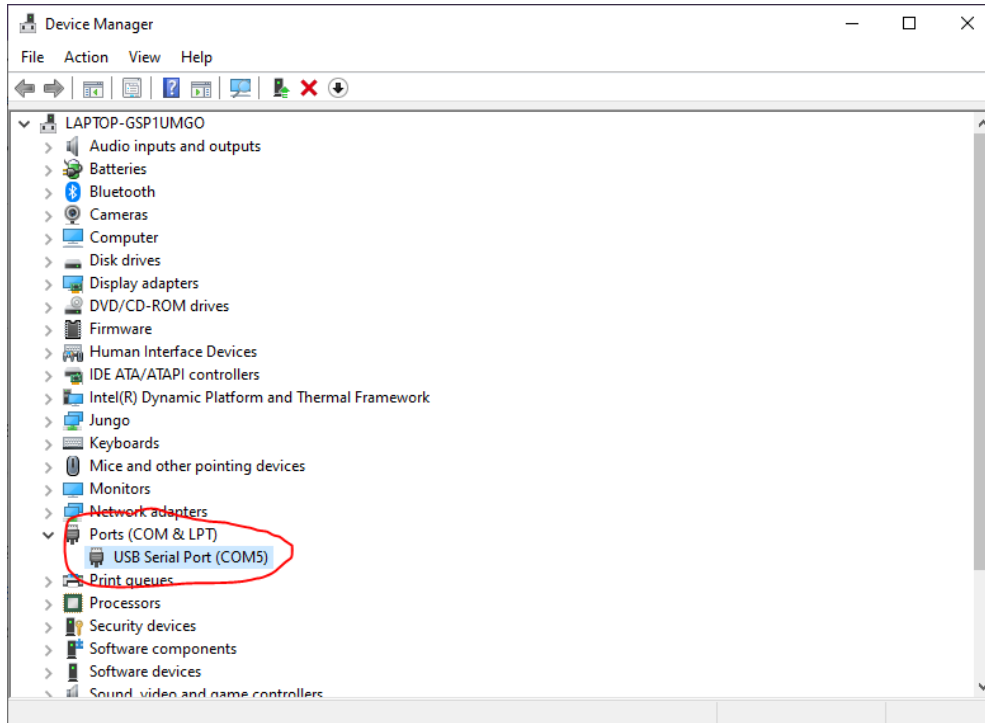
Step 2: Install Rust

Follow steps at https://www.rust-lang.org/tools/install

Install Rust

Using rustup (Recommended)

It looks like you're running Windows. To start using Rust, download the installer, then run the program and follow the onscreen instructions. You may need to install the Visual Studio C++ Build tools when prompted to do so. If you are not on Windows see "Other Installation Methods".

| DOWNLOAD RUSTUP-INIT.EXE (32-BIT) | DOWNLOAD RUSTUP-INIT.EXE (64-BIT) |

Step 3: Middleware Library (stuhfl-rs)

1. In the middleware library, open a terminal
2. Plug in the reader to a USB port. Open "Device Manager", click "Ports (COM & LPT)". You should see "USB Serial Port (COM*X*)" appear. For the current setup the antenna needs to be connected to **ANT1** on the reader board

3. Try running the tests.
   a. To list all available tests, run "cargo test --all-features -p libstuhfl --lib -- --list"

b. To run a test, use "cargo test --all-features -p libstuhfl --lib -- --show-output *test_name*"
c. I'd recommend to first run check_reader_version then inventory_once to ensure proper reader functionality before continuing.

```
PS D:\Github\stuhfl-rs> cargo test --all-features -p libstuhfl --lib -- --show-output check_reader_version
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
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warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
    Finished test [unoptimized + debuginfo] target(s) in 1.41s
     Running unittests src\lib.rs (target\debug\deps\libstuhfl-7c6091363ae9f52a.exe)

running 1 test
test tests::check_reader_version ... ok

successes:

---- tests::check_reader_version stdout ----
Board version: SW: v3.1.0.0, STUHFL SDK Evaluation FW @ STM32L4x6. HW: v1.1.0.0, ST25RU3993-EVAL Board.


successes:
    tests::check_reader_version

test result: ok. 1 passed; 0 failed; 0 ignored; 0 measured; 11 filtered out; finished in 1.64s
```

```
PS D:\Github\stuhfl-rs> cargo test --all-features -p libstuhfl --lib -- --show-output inventory_once
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
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warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
    Finished test [unoptimized + debuginfo] target(s) in 0.16s
     Running unittests src\lib.rs (target\debug\deps\libstuhfl-7c6091363ae9f52a.exe)

running 1 test
test tests::gen2::inventory_once ... ok

successes:

---- tests::gen2::inventory_once stdout ----
Inventory Statistics:Timestamp: 14
            Round Count: 1
            Tuning Status: Tuned
            RSSI log mean: 11
            Sensitivity: 3
            Final Q: 3
            Frequency: 865700 Hz
            ADC: 0
            Tag Count: 1
            Empty Slot Count: 40
            Collision Count: 0
            Preamble Error Count: 0
            CRC Error Count: 0
            RX Count Error Count: 0
            Resend Ack Count: 0
            Noise Suspicion Count: 0
Found tags:
00:80:B0:44:3C:00:00:00:12:0F:1F:9D


successes:
    tests::gen2::inventory_once

test result: ok. 1 passed; 0 failed; 0 ignored; 0 measured; 11 filtered out; finished in 2.47s
```
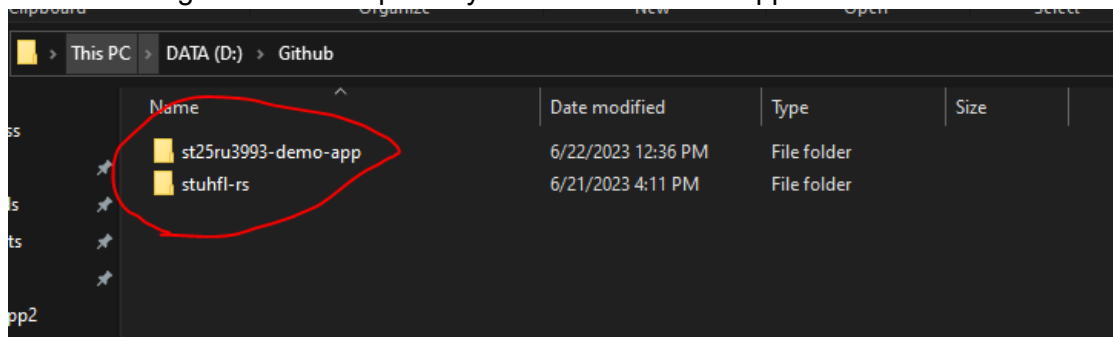
Step 4: Demo Application (st25ru3993-demo-app)

1. In a terminal go inside the repository "st25ru3993-demo-app"

   a.   Assuming all the previous steps were followed and the other tests passed, everything should work out of the box.
2. Try running some of the tests from the terminal:

a. To list all available tests, run "cargo test -- --list"
b. To run a specific test, run "cargo test -- --show-output *test_name*"
c. Note: these commands are much simpler because the demo app is intentionally less complicated than the library

```
PS D:\Github\st25ru3993-demo-app> cargo test -- --show-output em_read_config
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
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warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
warning: cl : Command line warning D9025 : overriding '/W4' with '/w'
    Finished test [unoptimized + debuginfo] target(s) in 0.20s
     Running unittests src\main.rs (target\debug\deps\rfid_app-6aeaf6f024f9a9ff.exe)

running 1 test
test tests::em_read_config ... ok

successes:

---- tests::em_read_config stdout ----
Reading Tag Settings...
Temp Sensor Control Words: [00, 00, 00, 00, 00, 00]
I/O Control Word: [E6, 00]
Battery Management Words: [00, 00, 00, 00]
TOTAL Words: [00, 00]
BAP Mode Word: [00, 00]


successes:
    tests::em_read_config

test result: ok. 1 passed; 0 failed; 0 ignored; 0 measured; 15 filtered out; finished in 2.74s

PS D:\Github\st25ru3993-demo-app>
```

3. You can also run the full demo app, which continuously reads temperature from nearby EM4325-based tags:
   a. On linux, just run "RUST_LOG=*info* cargo run"
   b. On windows first run $env:RUST_LOG = "info" then "cargo run" (this command only works in powershell instead of command prompt)

Appendix A
Fixing Compatibility Issues ST Firmware Board Version

The newer versions (V3.3.1.0) support a "batch command" mode, and because of this change, they reduced the size limit of generic command data. The result is the packet sizes mismatch and the firmware will have errors.
To fix this:

Steps to test the received power of the antennas:
1. Go into the stuhfl-rs folder, in the terminal do: cargo test --all-features -p libstuhfl --lib -- --show-output check_reader_version
2. Go into the demo app folder, in the terminal do: cargo test -- --show-output continuous_power