AWaDH
Agriculture and Water
Technology Development Hub

EXPERIMENT – 2

INTERFACING SHT40 SENSOR WITH DEV BOARD/NODE

What will you learn from this module:

Measure Temperature and Humidity using SHT40 sensor and Development Board/Node.

Requirements:

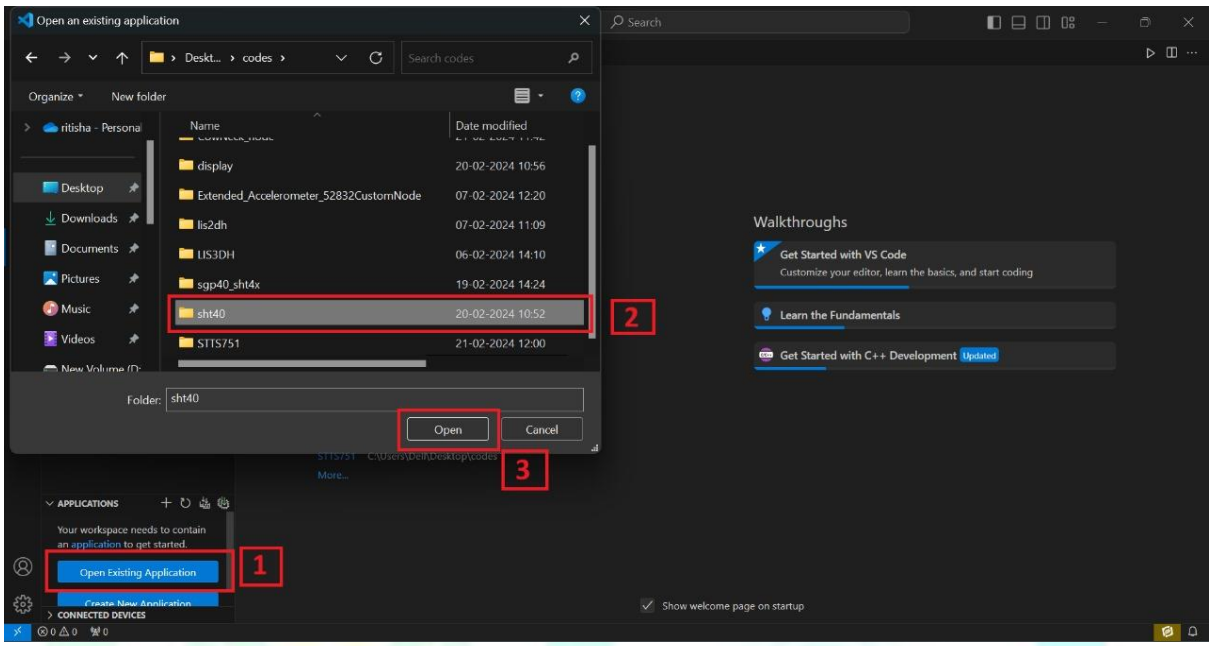
- nRF connect desktop software.
- nRF Command line tools.
- Visual studio code.
- USB cable.
- nRF52832 Development Board/Node.
- SHT40 Sensor.

Prerequisites:

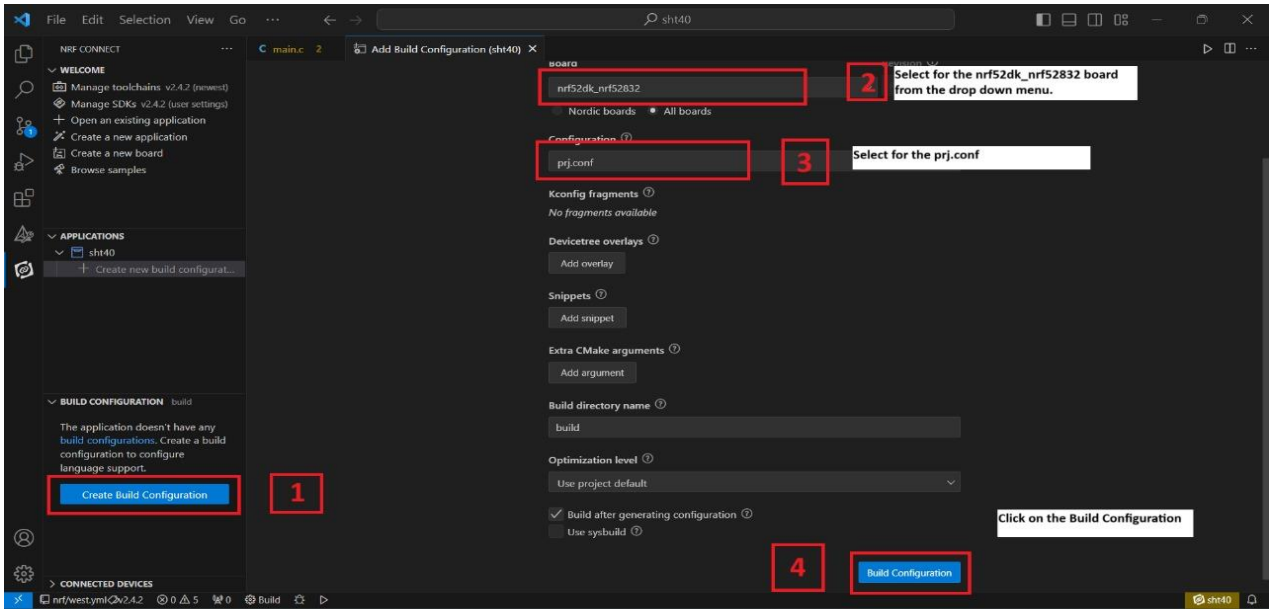
- Basic knowledge of C/C++
- Basic knowledge of communication protocol.
- Basic project setup.

Setup and Configuration:

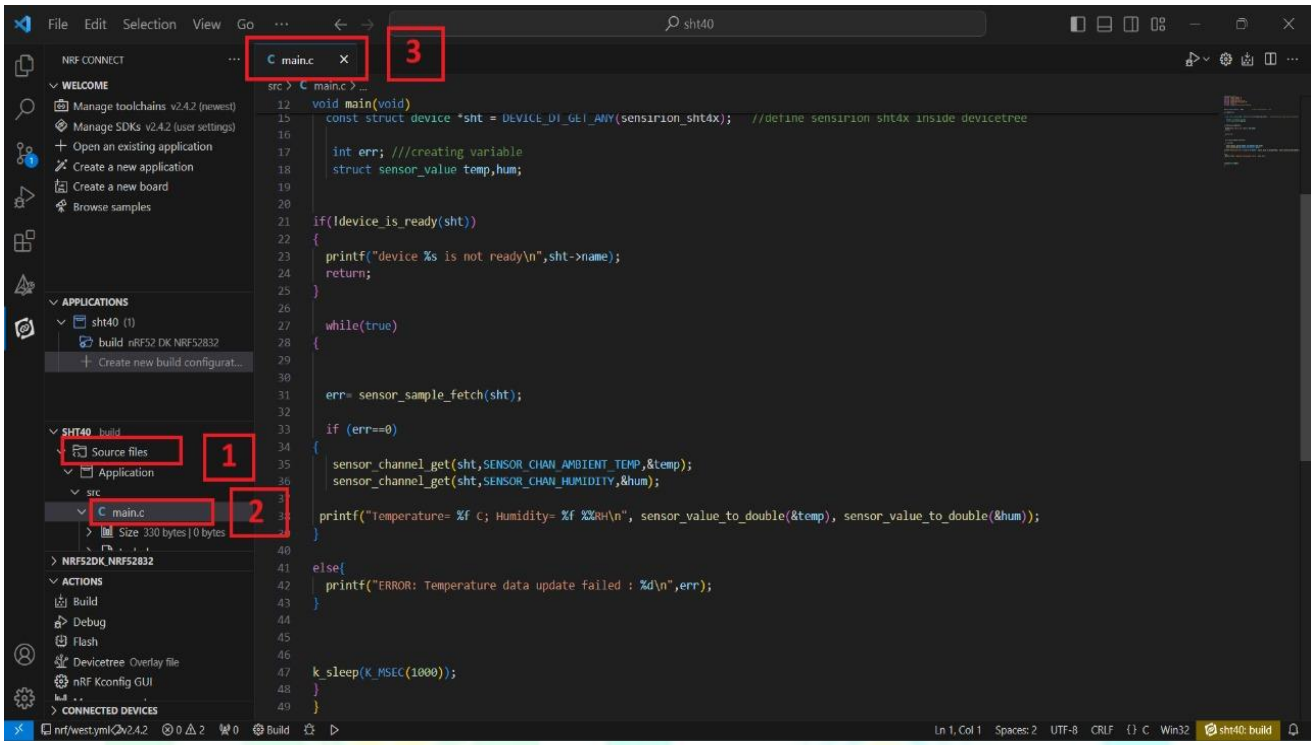
- Open VS Code and click on **Open Existing Application [1]** > click on **sht40 [2]** > **Open [3]** as shown in the picture below.



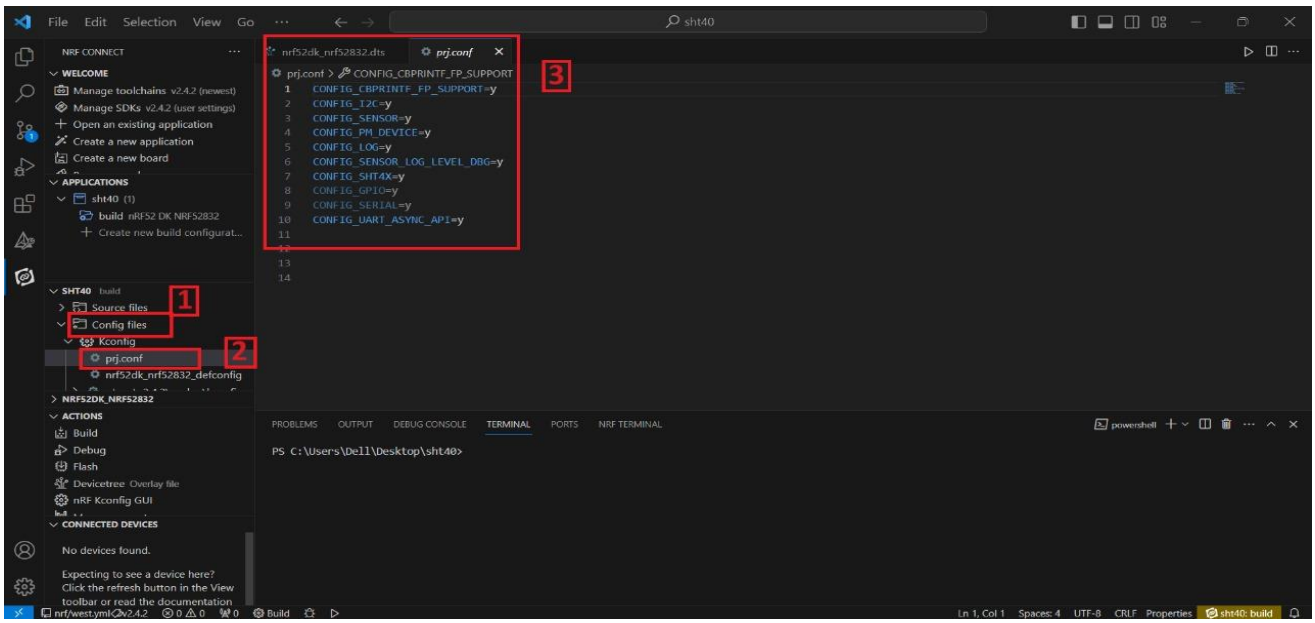
- Click on **Create new build configuration [1]**. Here you can change the board version, if you are using nRF52832, then select **nrf52dk_nrf52832 [2]** or you can change from dropdown menu for another version like nRF52833 etc.
- Click on the Configuration and select **prj.conf [3]** from dropdown menu and then click on the **Build Configuration [4]** as shown below in the picture.



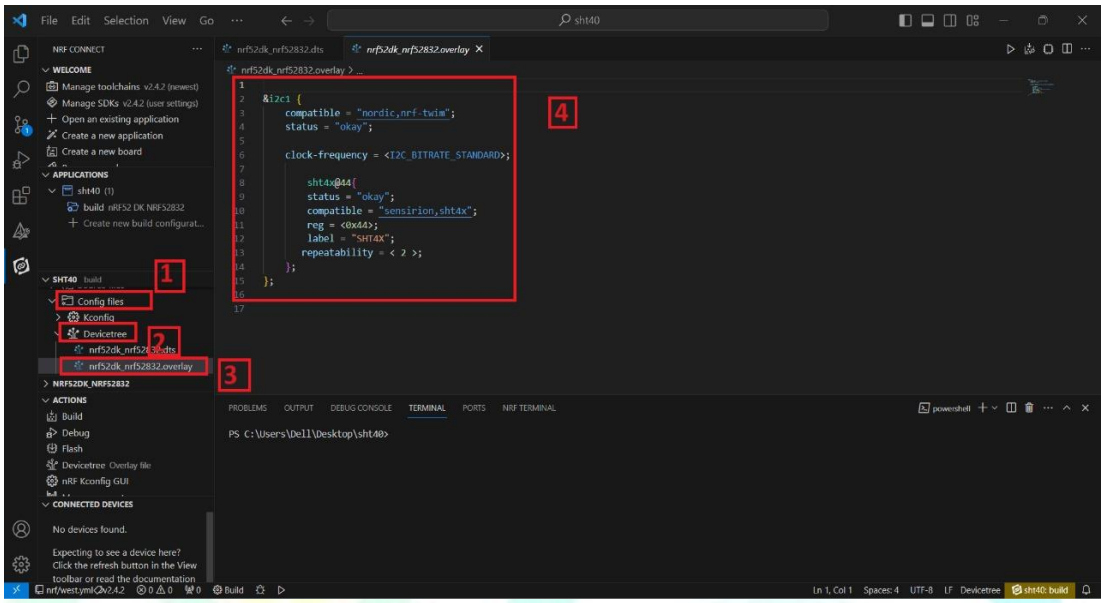
- Go to source file, click **source file [1]** > click on **Application** > click on **src** > click on **main.c [2]**.
- By clicking on **main.c** file and you will see the code on your screen **[3]**.



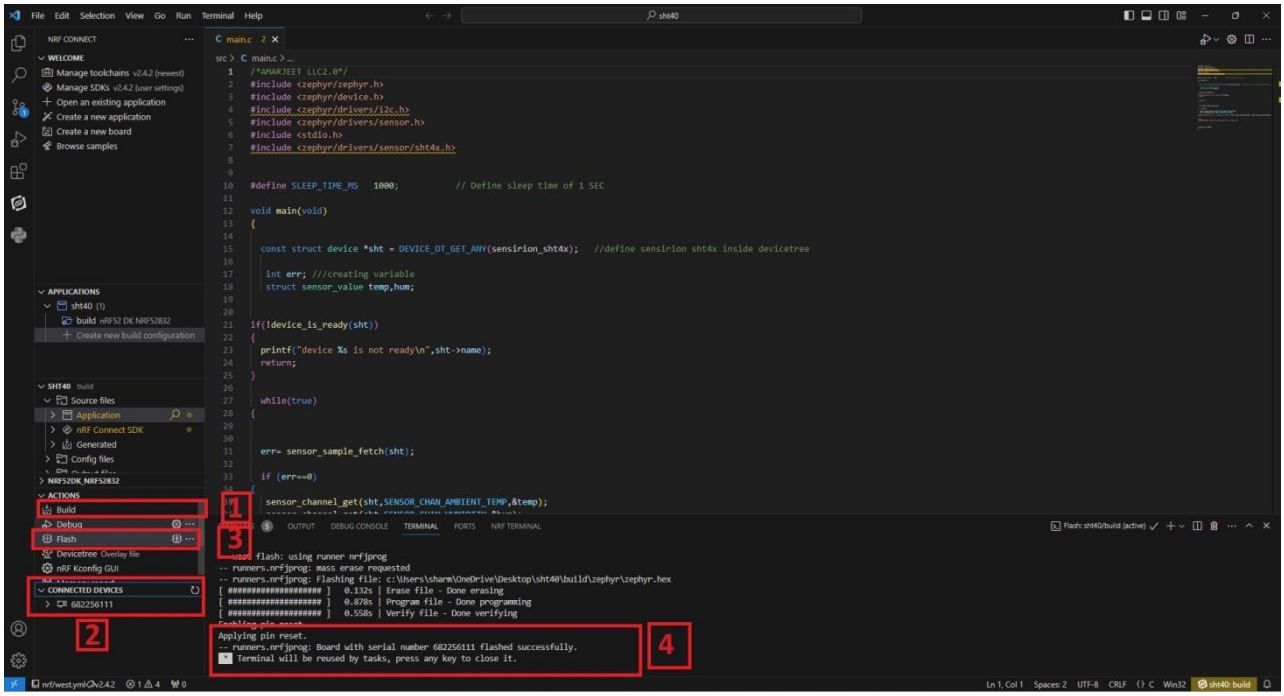
- To configure the prj configuration, click on **Config files [1]** > click on **Kconfig** > click on **prj.cong [2]**.
- The prj configuration will appear on your screen **[3]** as shown in the picture below.



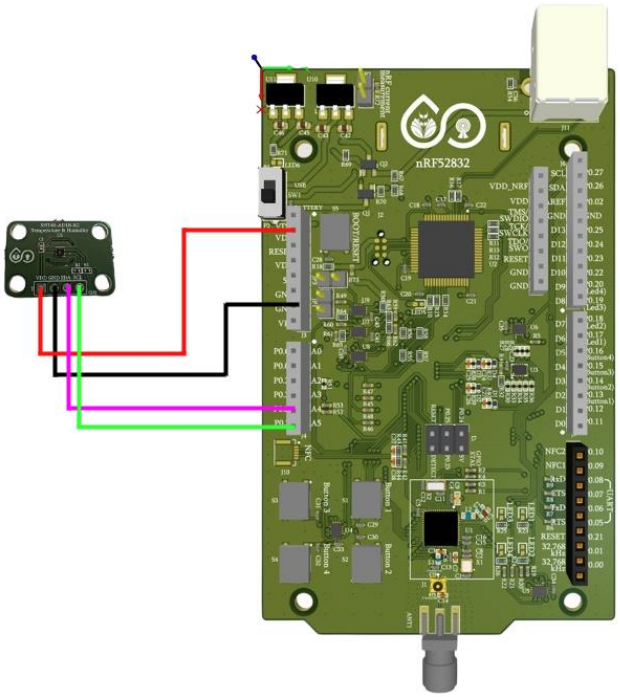
- To configure the i2c protocol, you have to enable it in the **.overlay file**.
- Click on the **Config files [1]** > click on **Kconfig** > click on **Devicetree [2]** > click on **nrf52dk_nrf52832.overlay [3]**.
- The .overlay file will appear on your screen and add the given code to the .overlay file as shown in the picture given below **[4]**.



- Click on **Build [1]** configuration again and check the **CONNECTED DEVICES [2]**.
- If device id is visible, then **Flash [3]** the code in Dev Kit.
- If **flashed successfully [4]** message is displayed on serial terminal, then flash process is complete.

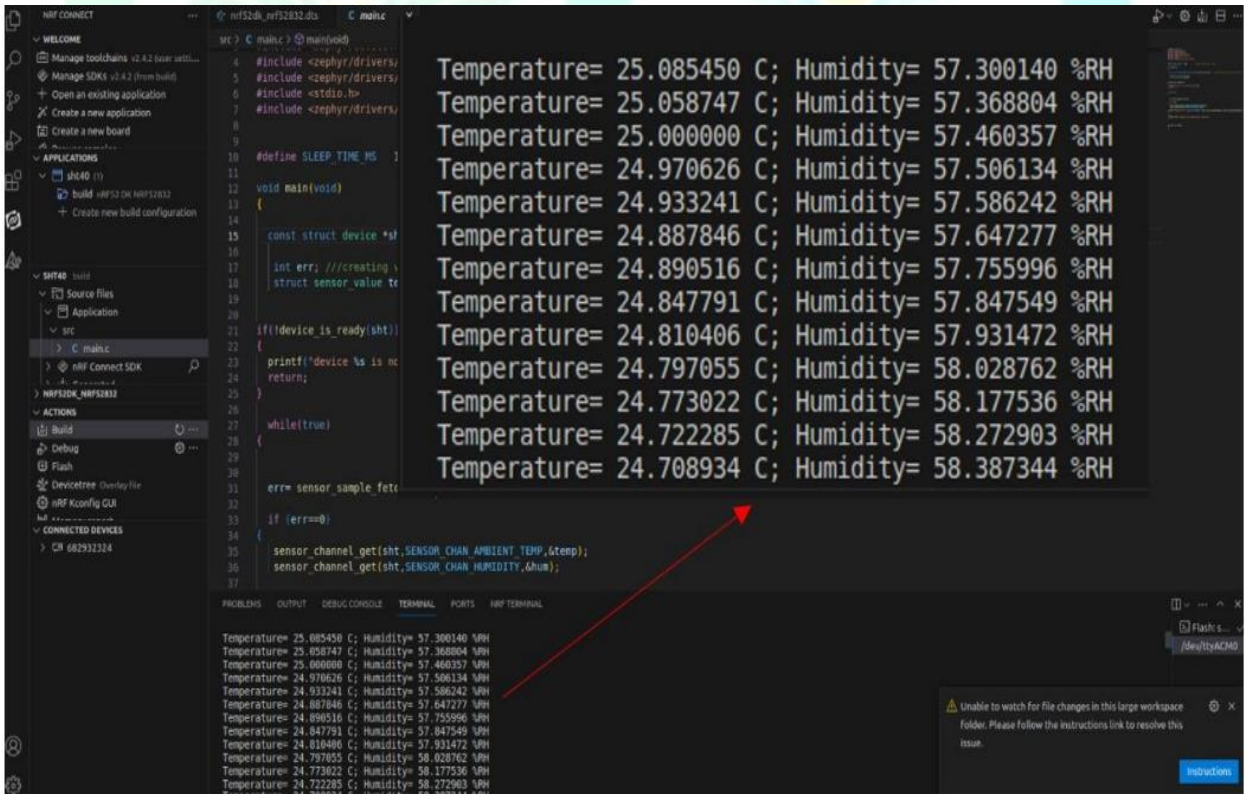


❖ PIN CONFIGURATION



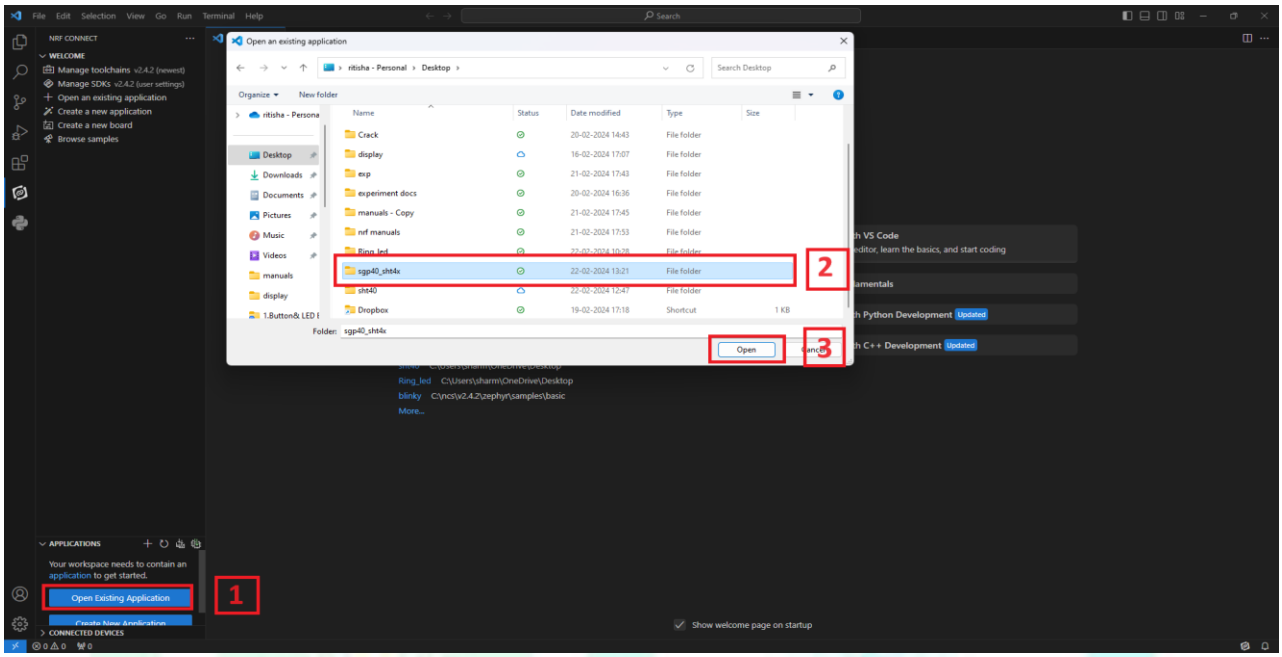
Board Pins -> Sensor Pins
VDD(3.3V) -> VDD
PO.30 -> SDA
PO.31 -> SCL
GND -> GND

❖ OUTPUT

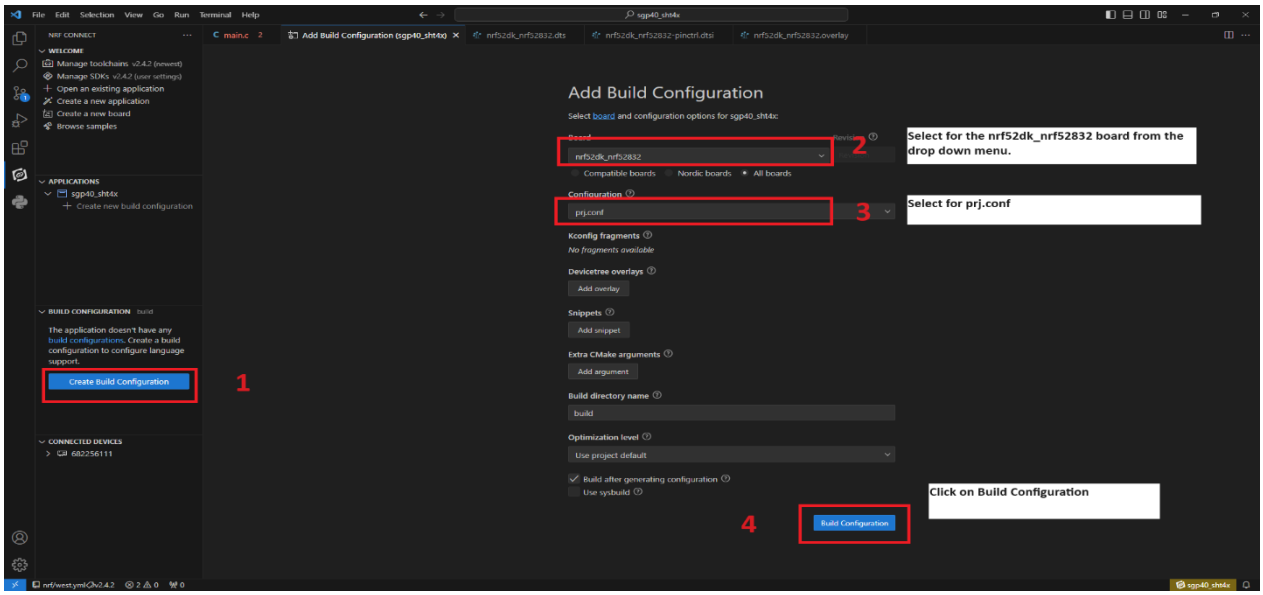


WITH THE HELP OF NODE

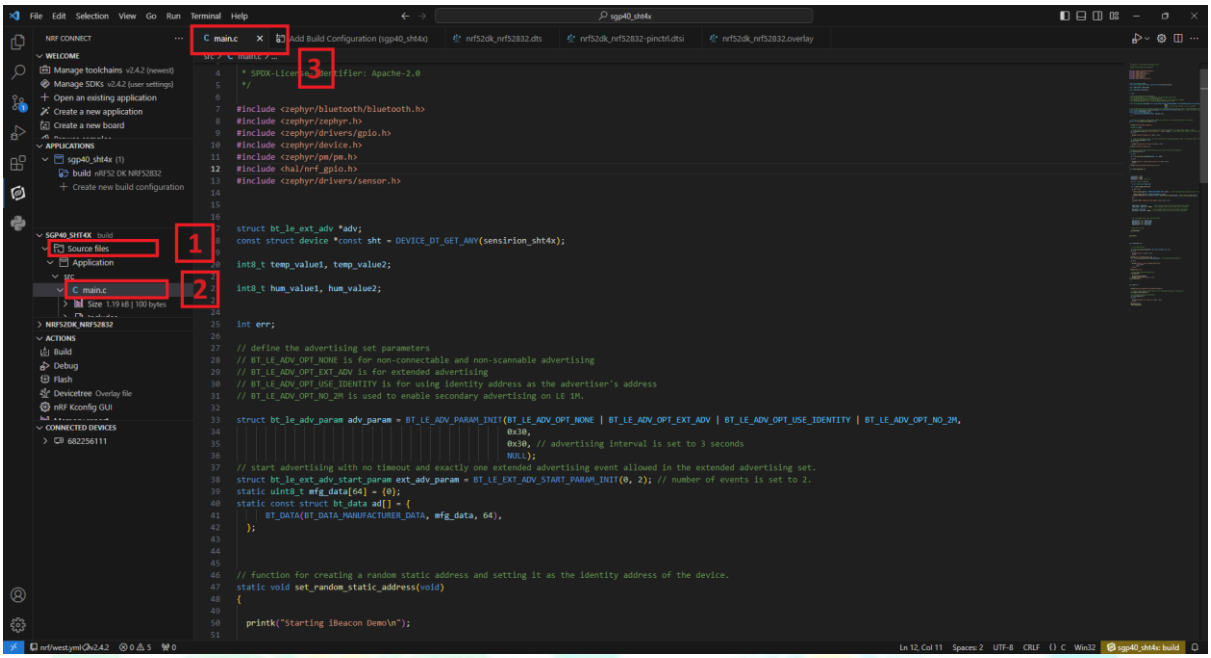
- Open VS Code and click on **Open Existing Application [1]** > click on **sgp40_sht4x [2]** > **Open [3]** as shown in the picture below.



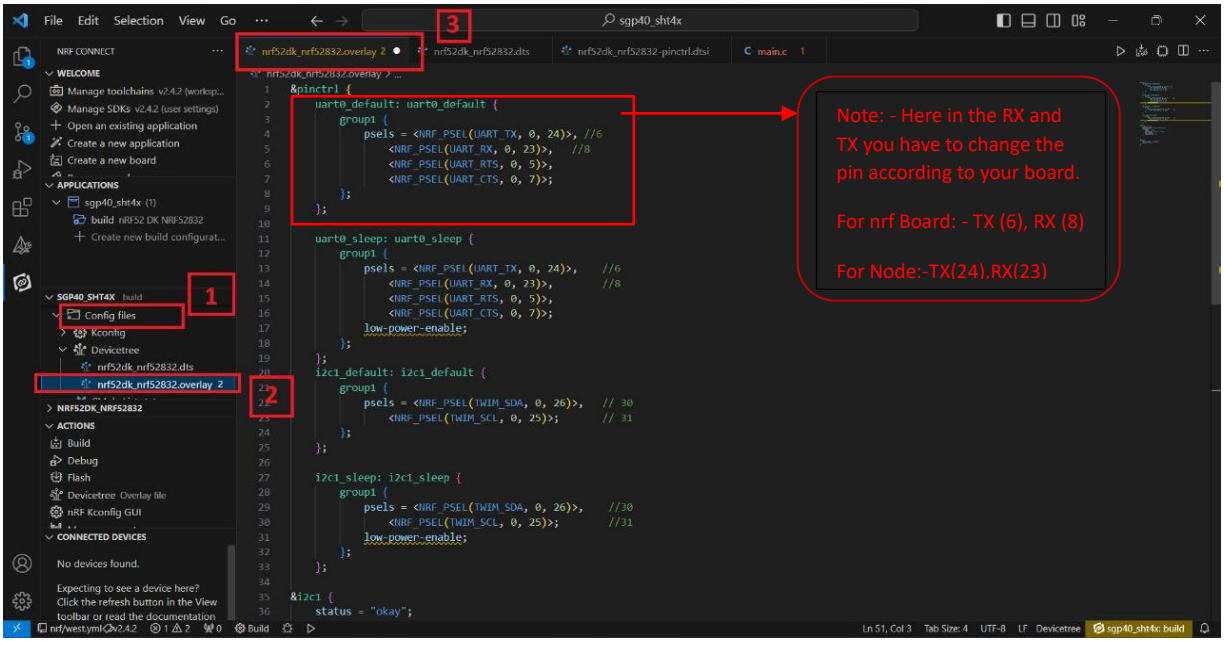
- Click on **Create new build configuration [1]**. Here you can change the board version, if you are using nRF52832, then select **nrf52dk_nrf52832 [2]** or you can change from dropdown menu for another version like nRF52833 etc.
- Click on the Configuration and select **prj.conf [3]** from dropdown menu and then click on the **Build Configuration [4]** as shown below in the picture.



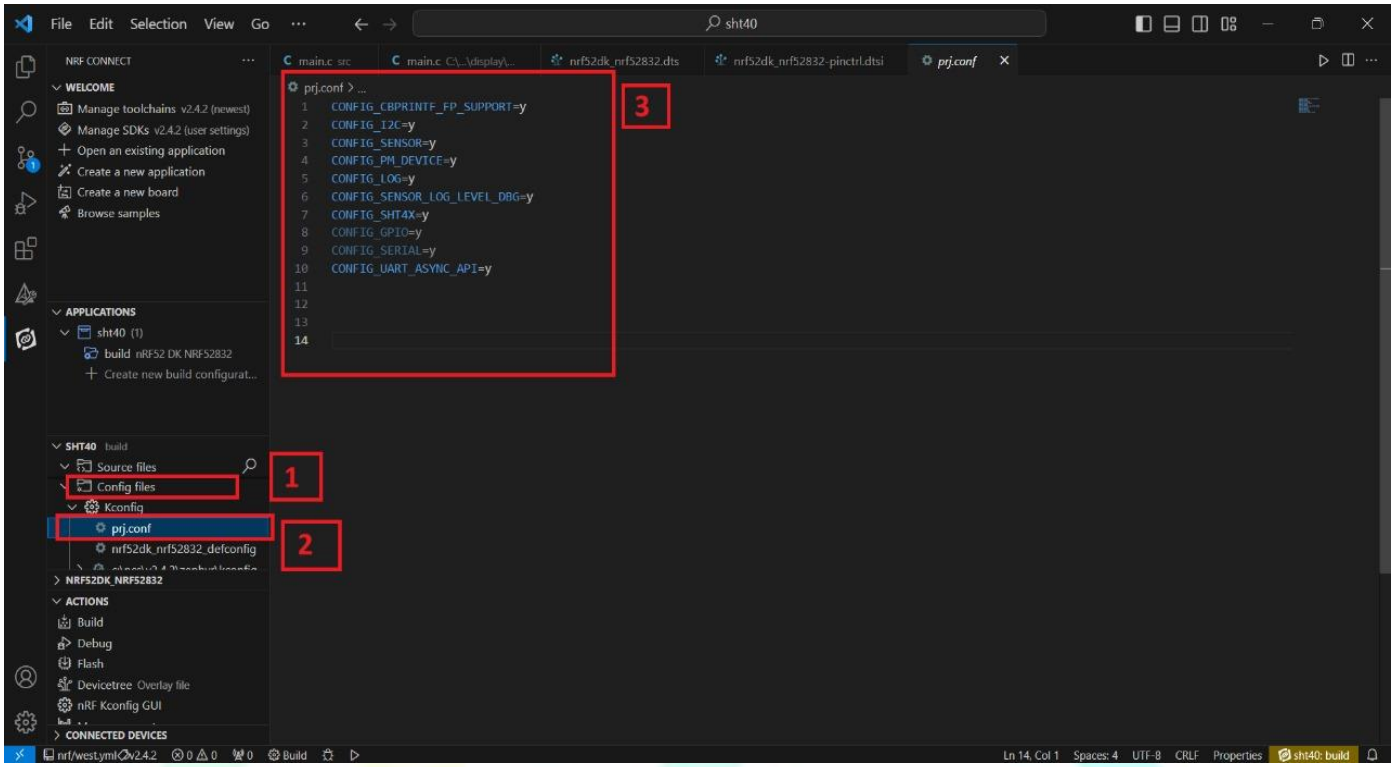
- Go to source file, click **source file [1]** > click on **Application** > click on **src** > click on **main.c [2]**.
- By clicking on **main.c** file and you will see the code on your screen **[3]**.



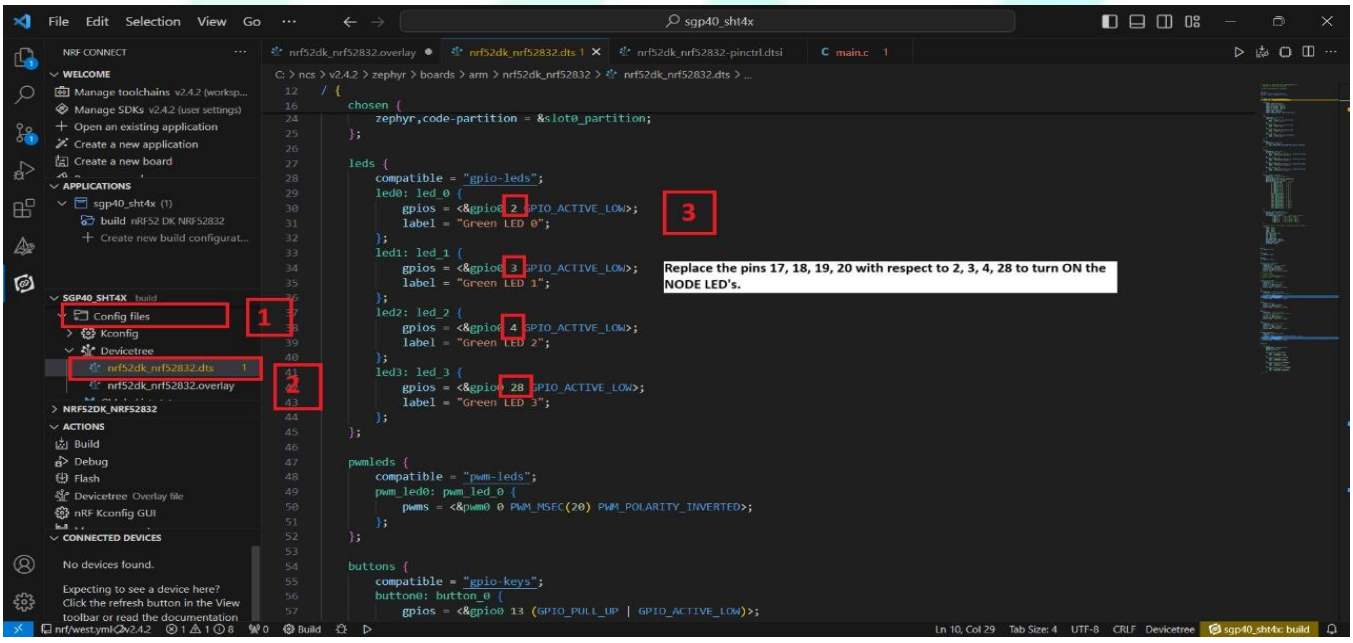
- To configure the i2c & UART protocols, you have to enable it in the **overlay file**.
- Click on the **Config files[1]** > click on **Kconfig** > click on **Devicetree** > click on **nrf52dk_nrf52832.overlay [2]**.
- The overlay file will appear on your screen and add the given code to the **overlay file** as shown in the picture given below **[3]**.



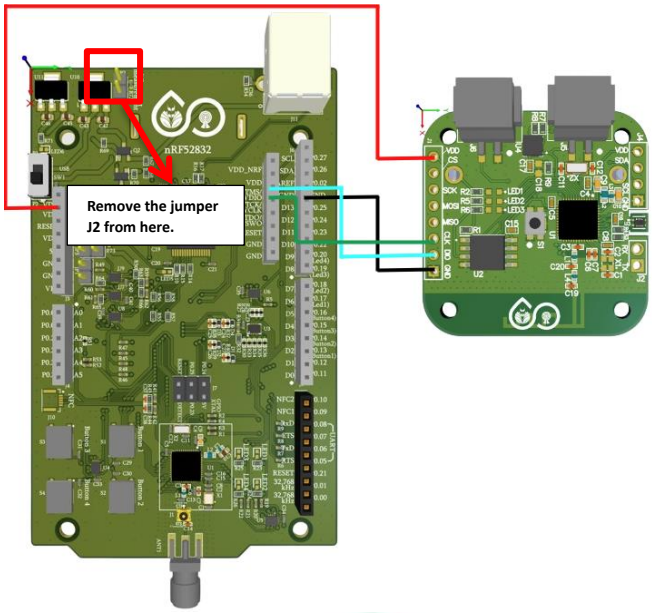
- You need to enable sensor in prj file for communication as shown below.
- Click on **Config files [1]** > then click on **Kconfig files** > click on **prj.conf** [2]



- You need to enable sensor in prj file for communication as shown below.
- Click on **Config files [1]** > then click on **Devicetree** > click on **nrf52dk_nrf52832.dts** [2]
- The **dts file** will appear on your screen and add the details in your **dts file** as shown in the picture given below **[3]**.



- For Node programing remove the jumper **J2** from the development board.
- Now flash the code with the help of nRF52832 development board as shown below in the figure.



Board Pins -> NODE Pins

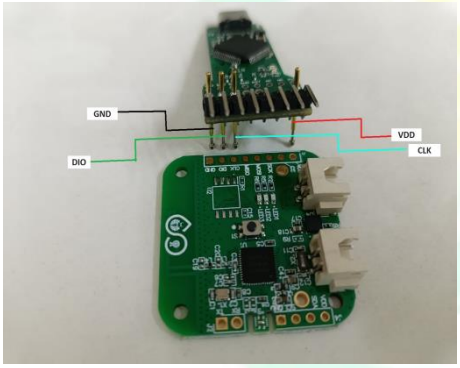
VDD(3.3V) -> VDD

GND -> GND

CLK -> CLK

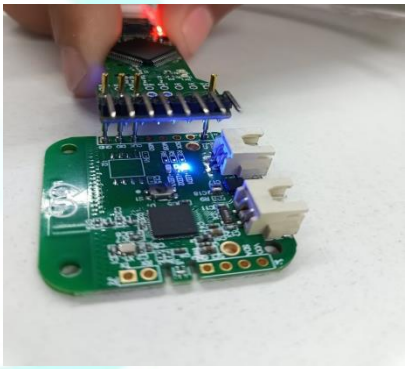
DIO -> DIO

- There is another way of flashing the code with the help of Node Programmer as shown in the picture below.



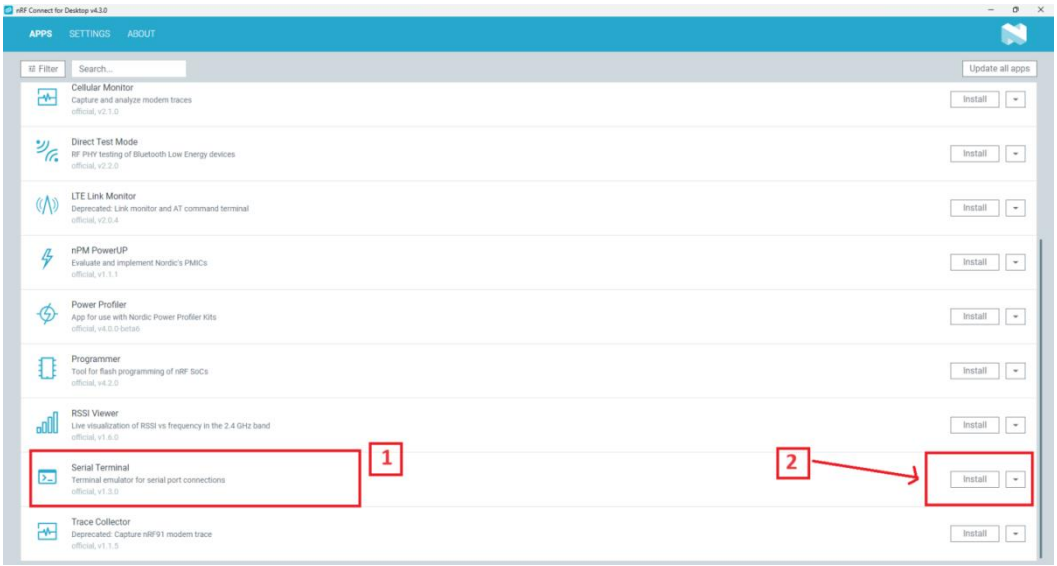
- NODE without connection.

- NODE with connection.

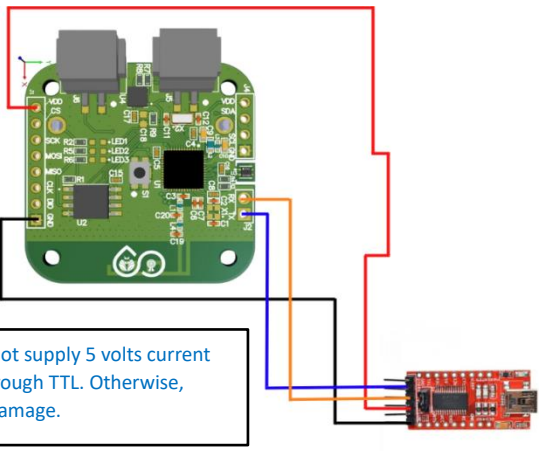


- NODE after program.

- Firstly, you have to **Install [2]** the nRF **Serial Terminal [1]** in nRF Connect for Desktop application as shown below.



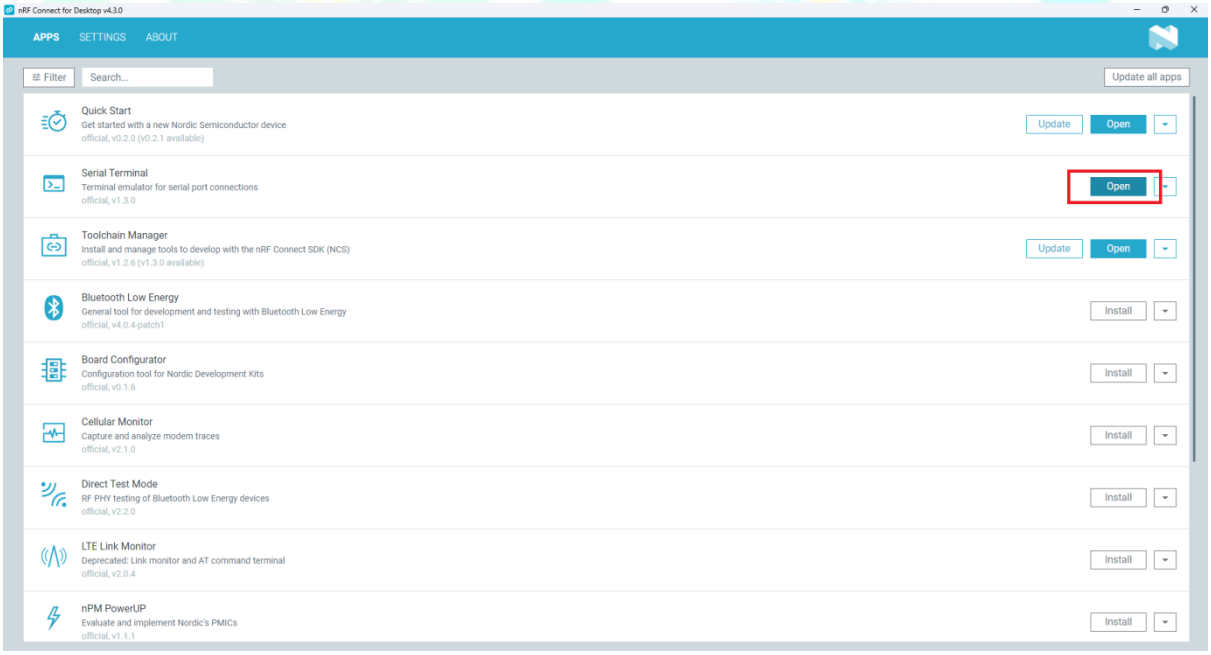
- Connect the **TTL Device** for UART communication so that the data must appear on the serial terminal.
- Connect the **TTL Device** as shown below in the picture.



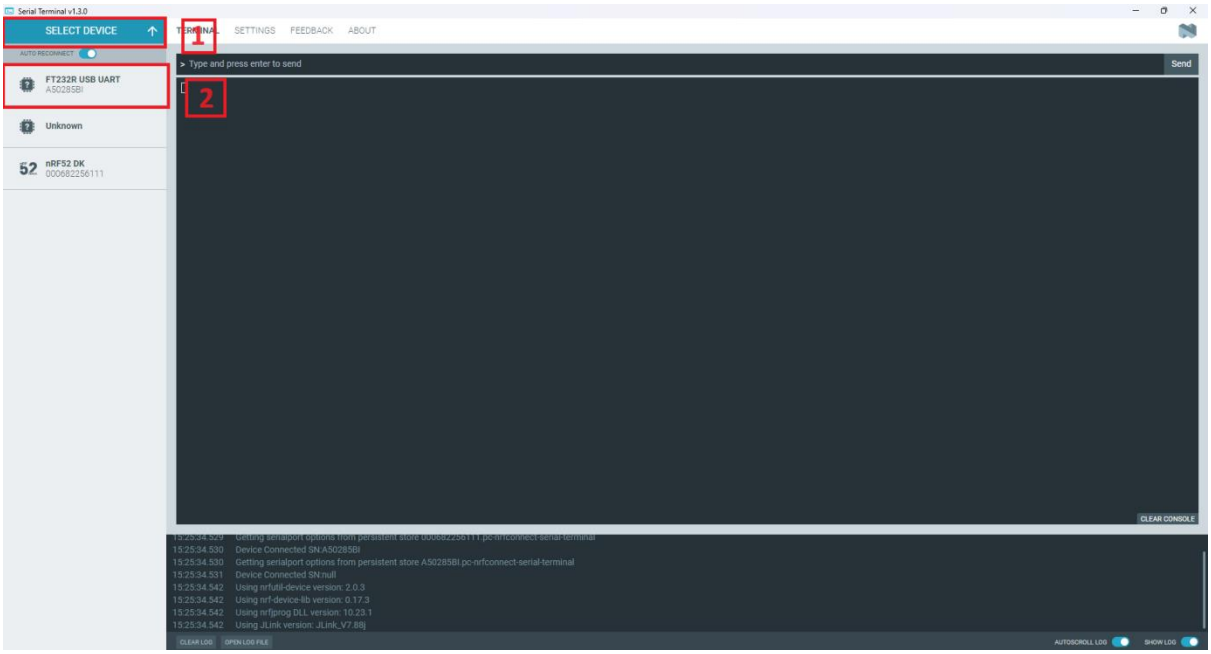
Note: - Do not supply 5 volts current to board through TTL. Otherwise, board will damage.

Node Pins -> TTL Pins
Tx -> Rx
Rx -> Tx
VDD(3.3V) -> VDD
GND -> GND

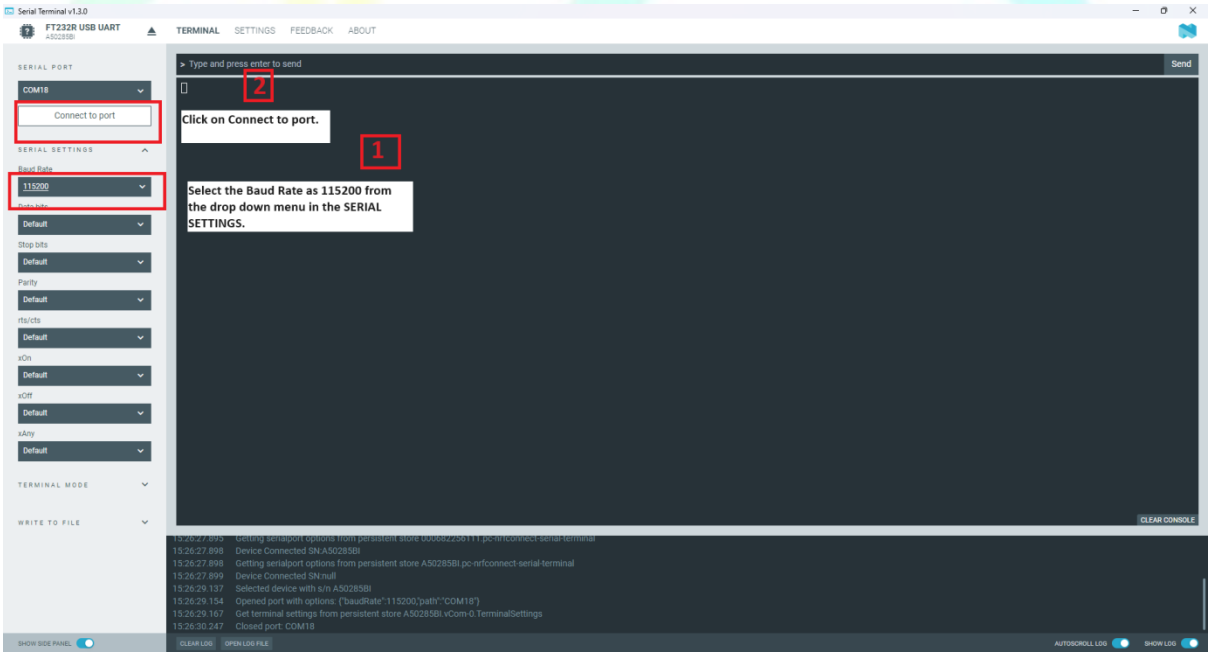
- Click on **Open** as shown below in the picture.



- Click on **Select Device [1]** > click on **FT232R USB UART [2]** as shown below in the picture.

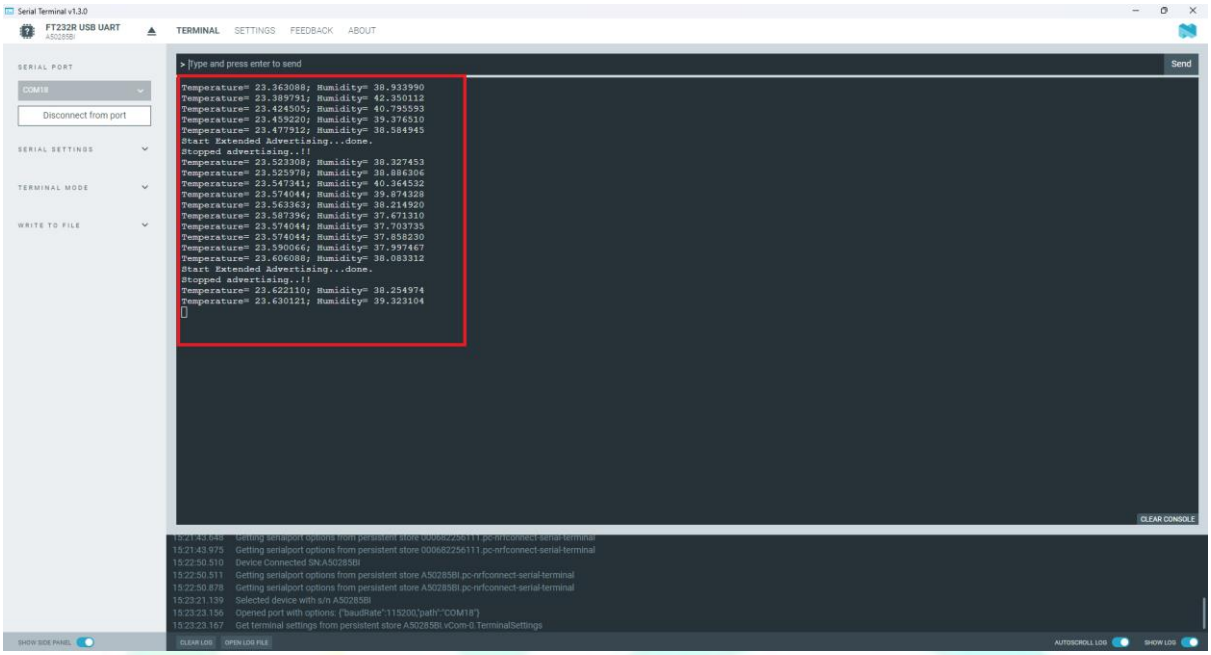


➢ Click on **SERIAL SETTINGS** > click on **Baud Rate [1]** > click on **Connect to port [2]** as shown below in the picture.



➢ Now the output will appear on your screen as shown below.

❖ OUTPUT


Serial Terminal v1.3.0
FT232R USB UART
TERMINAL
SETTINGS
FEEDBACK
ABOUT
SERIAL PORT
COM18
Disconnect from port
SERIAL SETTINGS
TERMINAL MODE
WRITE TO FILE
> Type and press enter to send
Send
Temperature= 23.363088; Humidity= 38.933990
Temperature= 23.389791; Humidity= 42.350112
Temperature= 23.424505; Humidity= 40.795593
Temperature= 23.459220; Humidity= 39.376510
Temperature= 23.477912; Humidity= 38.584945
Start Extended Advertising...done.
Stopped advertising..!!
Temperature= 23.523308; Humidity= 38.327453
Temperature= 23.525970; Humidity= 38.986306
Temperature= 23.547341; Humidity= 40.364532
Temperature= 23.574044; Humidity= 39.874328
Temperature= 23.563363; Humidity= 38.214920
Temperature= 23.587396; Humidity= 37.671310
Temperature= 23.574044; Humidity= 37.703735
Temperature= 23.574044; Humidity= 37.858230
Temperature= 23.590066; Humidity= 37.997467
Temperature= 23.606088; Humidity= 38.083312
Start Extended Advertising...done.
Stopped advertising..!!
Temperature= 23.622110; Humidity= 38.254974
Temperature= 23.630121; Humidity= 39.323104
CLEAR CONSOLE
15:21:43.975 Getting serialport options from persistent store 000682256111.pc-nrfconnect-serial-terminal
15:22:50.510 Device Connected SN:A50285BI
15:22:50.511 Getting serialport options from persistent store A50285BI.pc-nrfconnect-serial-terminal
15:22:50.878 Getting serialport options from persistent store A50285BI.pc-nrfconnect-serial-terminal
15:23:21.139 Selected device with s/n A50285BI
15:23:23.156 Opened port with options: {"baudRate":115200,"path":"COM18"}
15:23:23.167 Get terminal settings from persistent store A50285BI.vCom-0.TerminalSettings
SHOW SIDE PANEL
CLEAR LOG
OPEN LOG FILE
AUTOSCROLL LOG
SHOW LOG