**Connecting and Configuring a NEO-6M GPS Module with STM32F413 Discovery Board**

**1. Introduction**

**Purpose**  
This document provides detailed instructions for connecting and configuring a NEO-6M GPS module with an STM32F413 Discovery (DISCO) board.

**Scope**  
The scope includes hardware setup, firmware development, and testing procedures.

**2. Hardware Overview**

**2.1 STM32F413 Discovery Board**

**Description**  
The STM32F413 Discovery board is a development platform featuring the STM32F413 microcontroller, which includes an ARM Cortex-M4 core.

**Specifications**

* **Microcontroller**: STM32F413
* **Core**: ARM Cortex-M4
* **Clock Speed**: Up to 100 MHz
* **Flash Memory**: 1 MB
* **SRAM**: 320 KB
* **Interfaces**: USB, UART, I2C, SPI, etc.

**2.2 NEO-6M GPS Module**

**Description**  
The NEO-6M is a GPS module that receives signals from GPS satellites to determine its location.

**Specifications**

* **Interface**: UART
* **Operating Voltage**: 3.3V/5V
* **Baud Rate**: 9600 bps (default)
* **Protocol**: NMEA, UBX binary, and RTCM

**3. Hardware Connection**

**Pin Connections**

| **STM32F413 DISCO Pin** | **GPS Module Pin** | **Function** |
| --- | --- | --- |
| 3.3V | VCC | Power Supply |
| GND | GND | Ground |
| PF6(RX) | TX | UART |
| PF7(TX) | RX | UART |

**4. Firmware Development**

**4.1 Development Environment**

**Tools Required**

* STM32CubeIDE
* HAL Libraries

**Setup**

* Download and install STM32CubeIDE.
* Create a new project in STM32CubeIDE selecting the STM32F413 as the target microcontroller.
* Configure the UART peripheral for communication with the GPS module.

**5. Testing and Debugging**

**5.1 Test Procedures**

* Power on the STM32F413 Discovery board and ensure the GPS module is connected.
* Load the firmware onto the board.
* Open a serial terminal to view GPS data being received and processed.

**5.2 Debugging Tips**

* Ensure all connections are secure.
* Check the UART configuration and ensure it matches the GPS module requirements.
* Use a logic analyzer to verify UART communication.

**6. References**

[**https://www.youtube.com/watch?v=tq\_RoaPLahk&t=493s**](https://www.youtube.com/watch?v=tq_RoaPLahk&t=493s) **(reference video)**

**Source code:**



<https://os.mbed.com/platforms/ST-Discovery-F413H/> (disco board pinout)

<https://www.st.com/en/evaluation-tools/32f413hdiscovery.html> (Disco board documentation)

Neo 6m GPS module datasheet:

<https://content.u-blox.com/sites/default/files/products/documents/NEO-6_DataSheet_%28GPS.G6-HW-09005%29.pdf>