# SparkFun NEO-M9N GPS

We use the SparkFun NEO-M9N GPS as our **GNSS receiver**. The NEO-M9N GNSS module is manufactured by u-box.

u-blox published a comprehensive guide GPS Essentials of Satellite Navigation Compendium for a good foundation on how Satellite Navigation works. u-blox provides u-center, a free software tool under Windows (user guide), for interfacing to and configuring their GNSS receivers. u-blox provides an integration manual for a detailed description of their GNSS receiver. u-blox provides a detailed interface document for interfacing with their GNSS receiver, including NMEA, RTCM and u-blox's proprietary UBX binary interface.

SparkFun provides a Hookup Guide for the SparkFun NEO-M9N GPS.

## u-blox Firmware

u-blox provides u-center, a free software tool under Windows (user guide), to update the firmware on the GNSS module.

SparkFun provides tutorials on Getting Started with U-Center for u-blox and how to upgrade firmware of a u-blox GNSS receiver.

U-center requires the use of a **Windows computer**. Connect a USB to USB-C cable from the Windows computer to the USB-C port of the SparkFun NEO-M9N GPS.

**Installation u-center on the Windows computer**
Firefox: https://www.u-blox.com/en/product/u-center
> Click on u-center for Windows v.21.05
> Save
~/Downloads/u-center_v21.05.exe
> Double-click u-center_v21.05.exe
> Double-click u-center_v21.05

**Check firmware version**
> Launch **u-center**
> Select Receiver>Connection> COM <x>
Receiver Port <> icon turns green
> Select View>Messages View
> Select UBX>MON (Monitor)>VER (Version)
FWVER=**SPG 4.0.3**

**Download firmware**
Firefox: https://www.u-blox.com/en/product/neo-m9n-module
> Click Documentation & resources
> Click **M9 SPG 4.0.4 firmware** Link Download
> Save File
~/Downloads/JU_EXT_404…..bin

**Upgrade firmware**
> Launch **u-center**
> Select Receiver>Connection> COM <x>
Receiver Port <> icon turns green
> Select Tools>Firmware Update ...
> Enter Firmware image: ~/Downloads/JU_EXT_404…..bin
> Click GO (bottom left)
Firmware Update Success

# Arduino IDE

We use the SparkFun u-blox GNSS Arduino Library.

Open Arduino IDE
$: sudo arduino
> Select Sketch>Include Library>Manage Libraries…
> Select **SparkFun u-blox GNSS Arduino Libray**
> Click **2.0.7** Install
$: sudo chmod -R +666 /opt/SparkFun_RedBoard_Turbo

An already downloaded copy of the SparkFun u-blox GNSS library (used by installation script and Dockerfile) can be found here:
sw/SparkFun_RedBoard_Turbo/SparkFun_NEO-M9N_GPS/**SparkFun_u-blox_GNSS_Arduino_Library-master.zip**

The library is installed under
/opt/SparkFun_RedBoard_Turbo/Arduino/libraries/**SparkFun_u-blox_GNSS_Arduino_Library**.

# Read GNSS

We communicate with the SparkFun NEO-M9N GPS over **I2C** using **address 0x42**.

**Read GNSS**

$: sudo cp -r sw/SparkFun_RedBoard_Turbo/SparkFun_NEO-M9N_GPS/**read_gnss** /opt/SparkFun_RedBoard_Turbo/Arduino
$: sudo chmod -R +666 /opt/SparkFun_RedBoard_Turbo

Arduino IDE
$: arduino
> File>Sketchbook>**read_gnss**
> Click Serial Monitor icon
> Select 115200 baud
> Click Upload icon (until flash is successful)

*SparkFun NEO-M9N GPS*
*Current update rate: 1*
*Lat [degrees]: 32.96 Long [degrees]: -117.23 Alt [m]: 46.78 AltMSL [m]: 80.41 Fix: 3D Speed [m/s]: 0.86 Heading [degrees]: 281 pDOP: 3.18 SIV: 5 2021-6-21 1:16:44  Time is valid  Date is valid*

# Script

**Run as part of the Sensor Suite installation script**
sw/NVIDIA_Jetson_Xavier_NX/Scripts$ bash **install-7-Sensor_Suite.sh**

# Dockerfile

**Part of the Sensor Suite Dockerfile**
sw/NVIDIA_Jetson_Xavier_NX/Docker/**Dockerfile-7-Sensor_Suite**