# **ESP32 Optical Flow Sensor Interface using ADNS3080**

This document gives a connection diagram of ESP32 with ADNS3080 optical flow sensor PCB. A sample code is also provided. Of course, you can write your code from scratch to measure the distance in the x and y directions. However, a worked-out example has been provided here. This sample code can directly run on Microsoft Visual Studio Code.

1. Install Visual Studio Code available [here](https://code.visualstudio.com/).
2. Add PlatformIO IDE by following these [instructions](https://docs.platformio.org/en/stable/integration/ide/vscode.html).
3. Connect the ADNS3080 PCB with one SPI port of ESP32 using the following connection table:

|  |  |  |
| --- | --- | --- |
| PIN NAME/DESCRIPTION | ESP32 | ADNS3080 |
| Ground (GND) | GND | GND |
| Supply Voltage (5V) | 5V | 5V |
| Supply Voltage (3V) | No connection | 3V |
| Chip Select (CS/SS) | PIN 5 | NCS |
| Master Out Slave In (MOSI) | PIN 19 | MISO |
| Master In Slave Out (MISO) | PIN 23 | MOSI |
| Serial Clock (SCLK) | PIN 18 | SCLK |
| Reset (RST) | PIN 35 | RST |
| Power Down | No connection | NPD |
| LED Control | No connection | LED |

1. Mount the sensor on the sensor mount, as shown in the figure. Also, make sure that the LED is shining light just below the sensor lens. It is shown in the figure below.

A picture containing transport

Description automatically generated

Figure 1: Sensor mount

1. Upload the sample code on ESP32.
2. Adjust lens height and LED to see more than ten stars on the terminal. The number of stars shows the quality of the received image. Your flow sensor will be more accurate if you get a large number of stars. However, it will not be accurate if you see less than six stars. Examples of both cases are shown in the figures below.

A screenshot of a computer

Description automatically generated with medium confidence

Figure 2: The lens has a good focus (plenty of stars)

A screenshot of a computer

Description automatically generated

Figure 3: The lens has poor focus (only two stars are seen)

1. Reset the ESP32. You will see Distance\_x=0 and Distance\_y=0 on the terminal. It is considered the starting point. Move your rover in x and y directions. The distance from starting point will be displayed in cm on the screen. Examples of this are given in the figures below. You can modify the code to show this distance in mm for better accuracy.

A screenshot of a computer

Description automatically generated with medium confidence

Figure 4: Starting point

A screenshot of a computer

Description automatically generated

Figure 5: Rover has moved 5 cm in the x-direction and 5 cm in the y-direction