Module Overview

Introduction

The Global Position System, or GPS, is an incredibly useful tool that has seen use in a variety of industries and applications. GPS is a part of the Global Navigation Satellite System (GNSS), and is used to provide geographical location and time to receivers. It has seen a variety of uses and is one of the primary sources of navigational data and positioning. GPS is reliant on a network of satellites orbiting the earth to provide an accurate approximation of a receivers location. A receiver needs a minimum of 4 satellites in order to accurately find its location. This is accomplished by each satellite sending a continuous message to each receiver containing its identification number, location in orbit, and time of transmission. Since the signals sent by the satellites travel at the speed of light, a distance can be calculated based off time of flight, and known speed of the message.

Hardware Overview

For this course, we are using a commonly used GPS module, the GY-NEO6MV2, which sees extensive use in battery operated and small form factor applications, such as drone racing. The NEO6MV2 is a standalone GPS receiver that provides location and time information over a standard Universal Asynchronous Receiver-Transmitter (UART), connection with a micro-controller, in this case our Arduino. This UART connection is typically made with 4 direct wired connections between the module and the micro-controller. Those four connections are VCC, RX, TX, and GND.

In our application, the module slots directly into the break out board, and only two connections are required to communicate with our controller, the RX and TX pins. RX is the "receiver" channel for the module, and TX is the "transmitter". The RX pin on the module will connect with the TX pin on our Arduino, and the TX pin on our module will connect with the RX pin on the Arduino. A wiring diagram is provided below as well to illustrate this point.

As for the VCC and GND pins, these are the main source of power for the module. While normally it is possible to provide power for the module directly from the controller, in this case, we are providing power for the module through the break out board. VCC is a 5V input, while GND is the common ground.

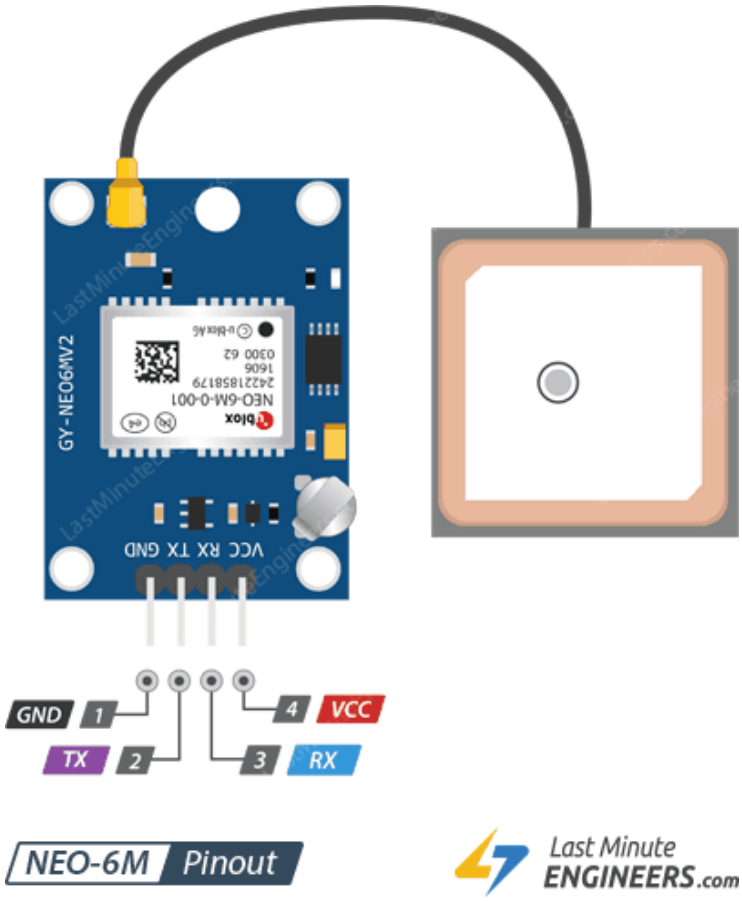

Figure 1: GPS Pinout

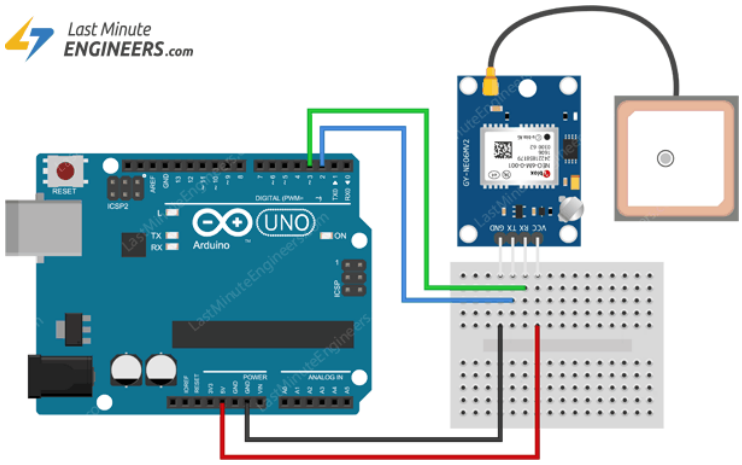

Figure 2: Wiring Diagram

Module Pinout

Wiring Guide

The figure above shows the wiring diagram used in this project. To connect the TX pin on the breakout board, to Pin 19 (RX1) on the Arduino Mega (Green Wire). RX on the breakout board, connects to Pin 18 (TX1) on the Arduino Mega (Blue Wire).

Coding Guide

In order to use the GPS module after making these connections, we have to write some code for the Arduino to facilitate the communication. Since GPS uses a standardized communication protocol, there are numerous code libraries implemented for the Arduino to communicate with the module, and decipher the message coming from it. This module makes use of the TinyGPS++ library in the Arduino IDE. We use this library to open the serial communication ports on the Arduino, and decipher the NMEA sentences that come from the GPS unit. Below is the code you will need to get started.

Arduino

Libraries