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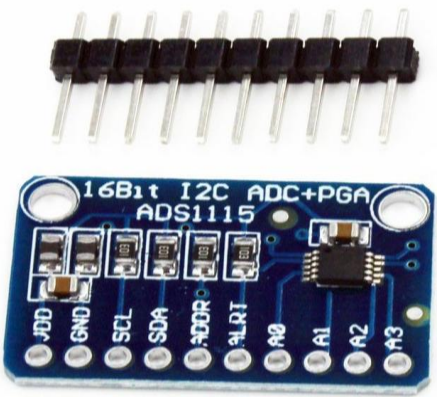
ADS1115 16-Bit ADC - 4 Channel with Programmable Gain Amplifier

Introduction:

The ADS1115 device is a precision, low-power, 16-bit, I2C-compatible, analog-to-digital converters (ADCs) offered in an ultra-small, leadless, X2QFN-10 package, and a VSSOP-10 package. The device incorporates a low-drift voltage reference and an oscillator. The converter also incorporates a programmable gain amplifier and a digital comparator. These features, along with a wide operating supply range, make the converter well suited for power- and space-constrained, sensor measurement applications.

The ADS1115 perform conversions at data rates up to 860 samples per second (SPS). The PGA offers input ranges from ±256 mV to ±6.144 V, allowing precise large- and small-signal measurements. The converter features an input multiplexer that allows two differential or four single-ended input measurements. Use the digital comparator in the ADS1115 for under- and overvoltage detection.

The ADS1115 operates in either continuous-conversion mode or single-shot mode. The devices are automatically powered down after one conversion in single-shot mode; therefore, power consumption is significantly reduced during idle periods.



Components:

- Arduino Uno Board
- ADS1115 16-Bit ADC - 4 Channel with Programmable Gain Amplifier
- Several Jumper Wires

Objective:

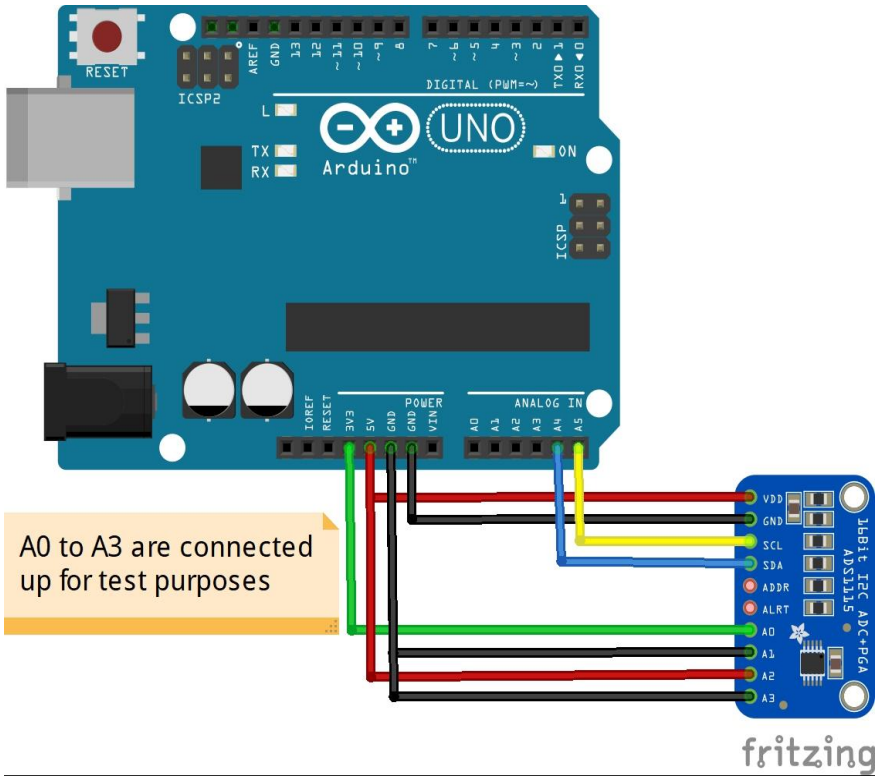
Improve Arduino resolution and measurement accuracy.

Procedures:

Step 1: Build the circuit.

The connection between the ADS1115 16-Bit ADC and the Arduino Uno Board:

ADS1115 16-Bit ADC	Arduino Uno Board
VDD	5V
GND	GND
SCL	A5
SDA	A4
A0	3.3V
A1	GND
A2	5V
A3	GND



Step 2: Insert the sample programming provided below by copy and paste it into Arduino IDE.

```
#include <Wire.h>
#include <Adafruit_ADS1015.h>

Adafruit_ADS1115 ads(0x48);

void setup(void)
{
Serial.begin(9600);
Serial.println("Hello!");

Serial.println("Getting single-ended readings from AIN0..3");
Serial.println("ADC Range: +/- 6.144V (1 bit = 3mV/ADS1015, 0.1875mV/ADS1115)");

ads.begin();
}

void loop(void)
{
int16_t adc0, adc1, adc2, adc3;

adc0 = ads.readADC_SingleEnded(0);
adc1 = ads.readADC_SingleEnded(1);
adc2 = ads.readADC_SingleEnded(2);
adc3 = ads.readADC_SingleEnded(3);
Serial.print("AIN0: ");
Serial.println(adc0);
Serial.print("AIN1: ");
Serial.println(adc1);
```

```
Serial.print("AIN2: ");
Serial.println(adc2);
Serial.print("AIN3: ");
Serial.println(adc3);
Serial.println(" ");

delay(1000);
}
```

Step 3: Open the serial monitor to observe the result as shown below.