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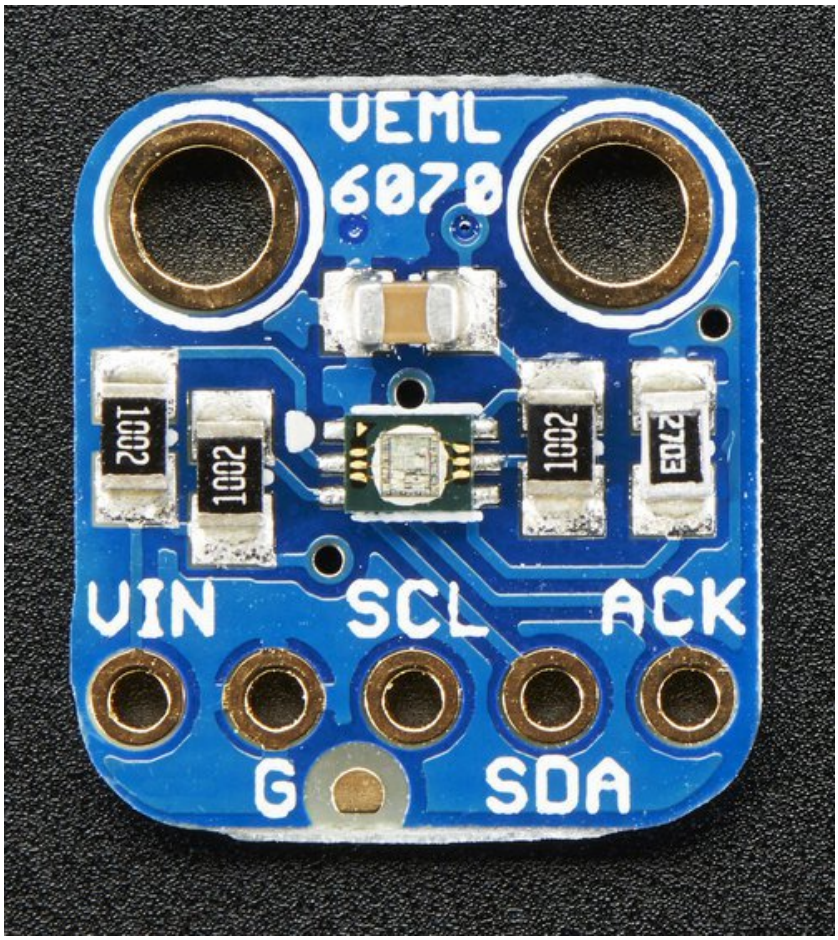
Adafruit VEML6070 UV Sensor Breakout

Created by lady ada



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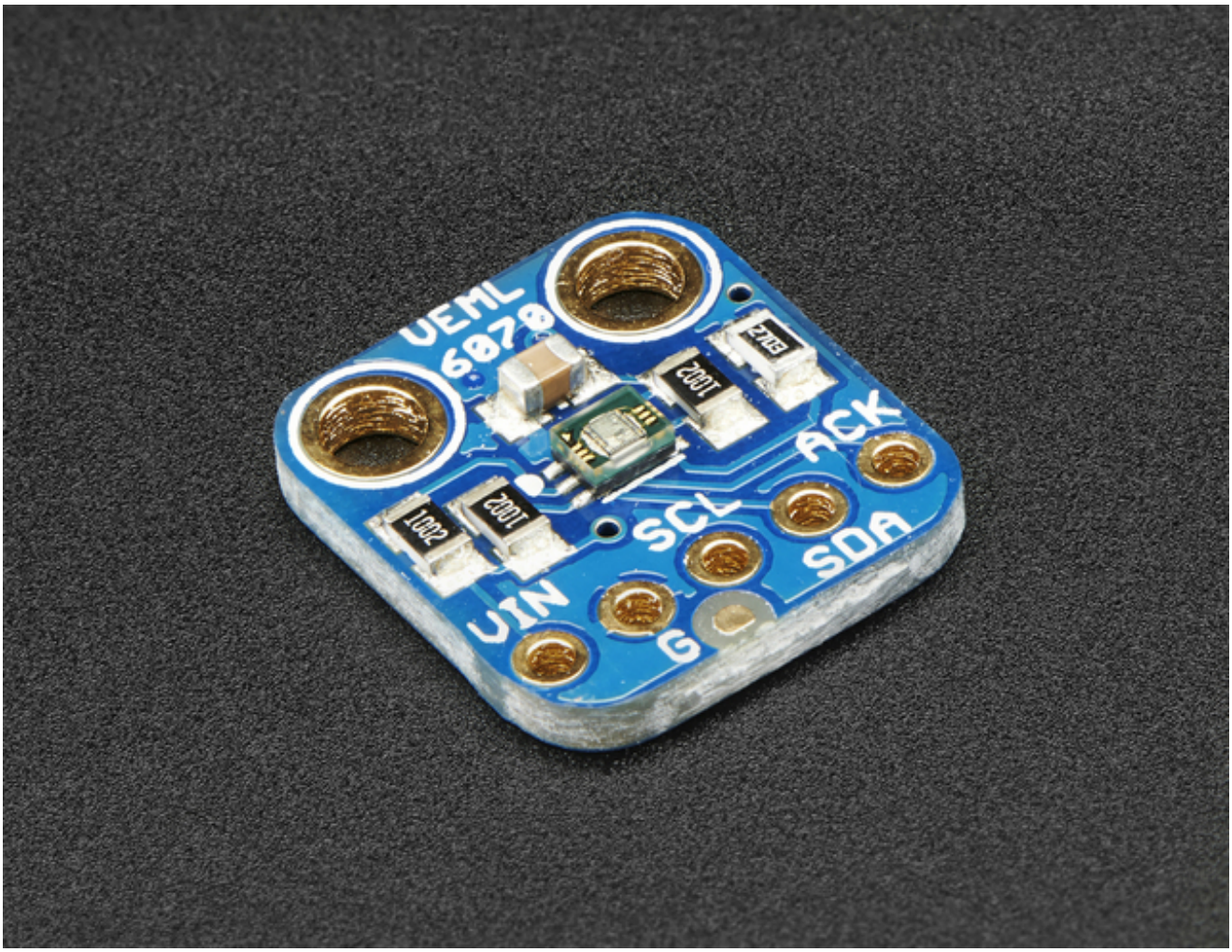
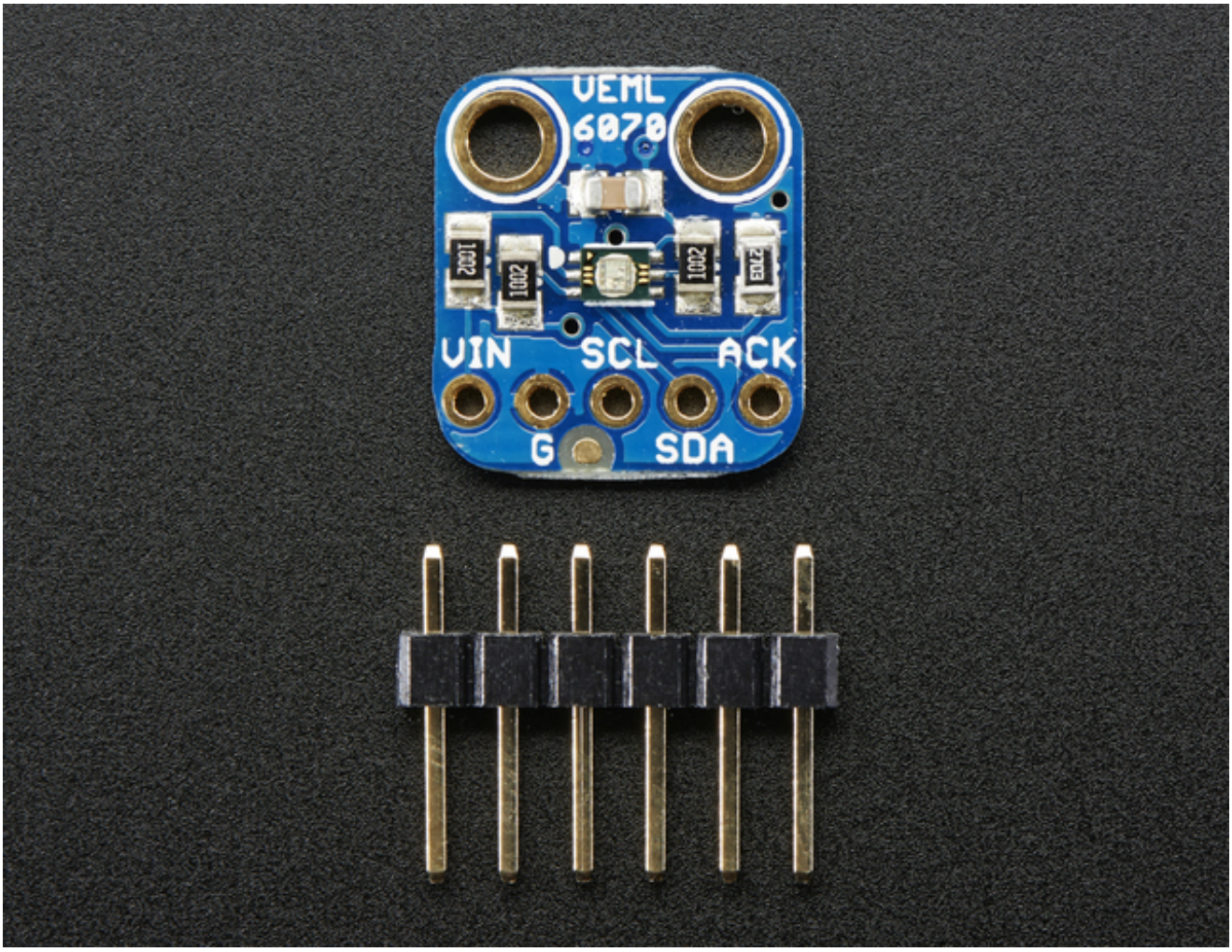
Overview



This little sensor is a great way to add UV light sensing to any microcontroller project. The VEML6070 from Vishay has a true UV A light sensor and an I2C-controlled ADC that will take readings and integrate them for you over ~60ms to 500ms.

Unlike the Si1145 (http://adafru.it/1777), this sensor will not give you UV Index readings. However, the Si1145 does UV Index approximations based on light level not true UV sensing. The VEML6070 in contrast does have a real light sensor in the UV spectrum. It's also got a much much simpler I2C interface so you can run it on the smallest microcontrollers with ease.

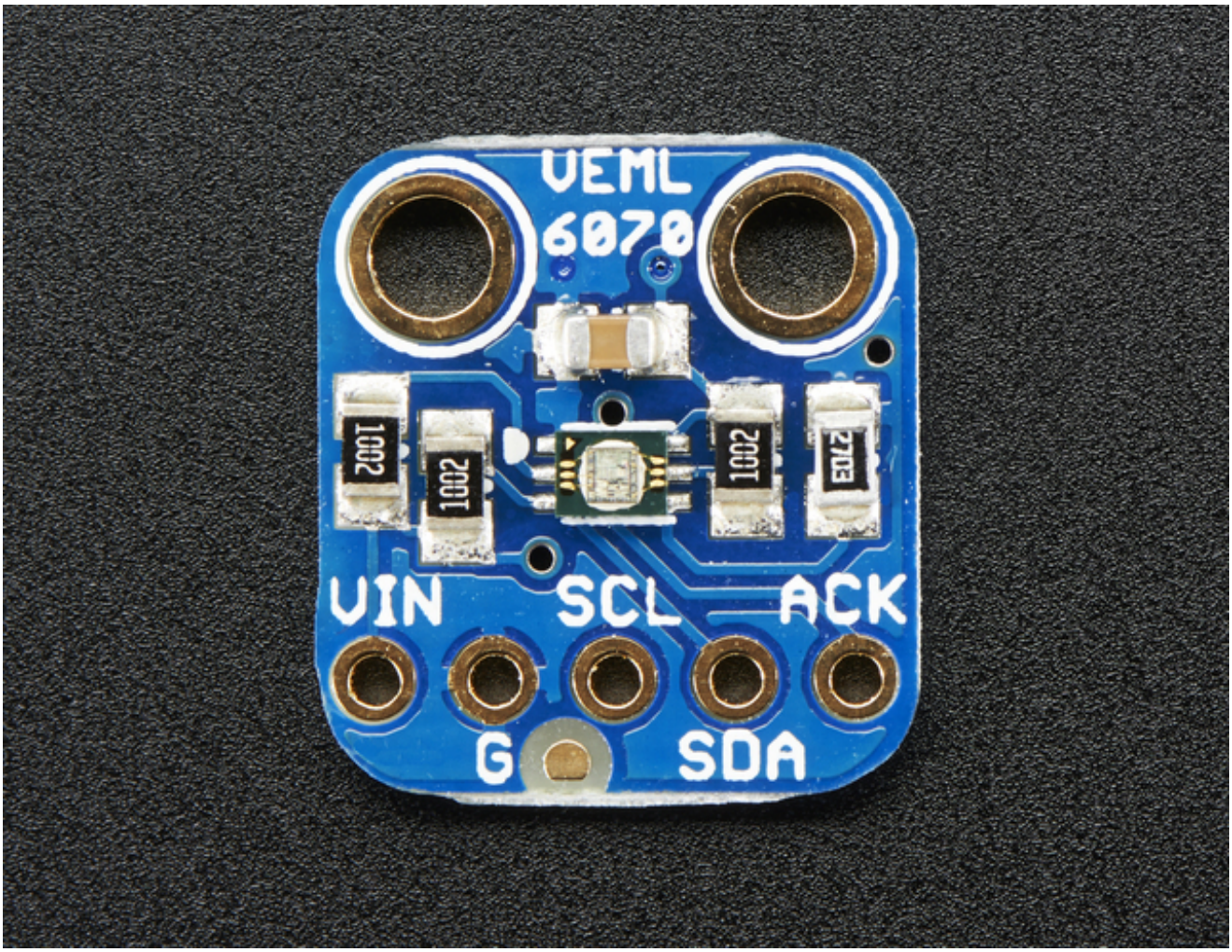
Unlike the GUVA analog sensor (http://adafru.it/1918), the biasing and ADC is all internal so you don't need an ADC.



This UV sensor works great with 3 or 5V power or logic, its nice and compact, and its easy to use with any I2C-capable microcontroller.

Each order comes with one assembled PCB with a sensor, some handy pullup resistors, a 270K rset resistor and a small piece of header. Some light soldering is required to attach the header but its a fast task!

Pinouts



Power Pins:

- **Vin** - this is the power pin. The sensor chip uses 3 to 5 VDC, so you can use it with just about any microcontroller. To power the board, give it the same power as the logic level of your microcontroller - e.g. for a 5V micro like Arduino, use 5V
- **GND** - common ground for power and logic

I2C Pins

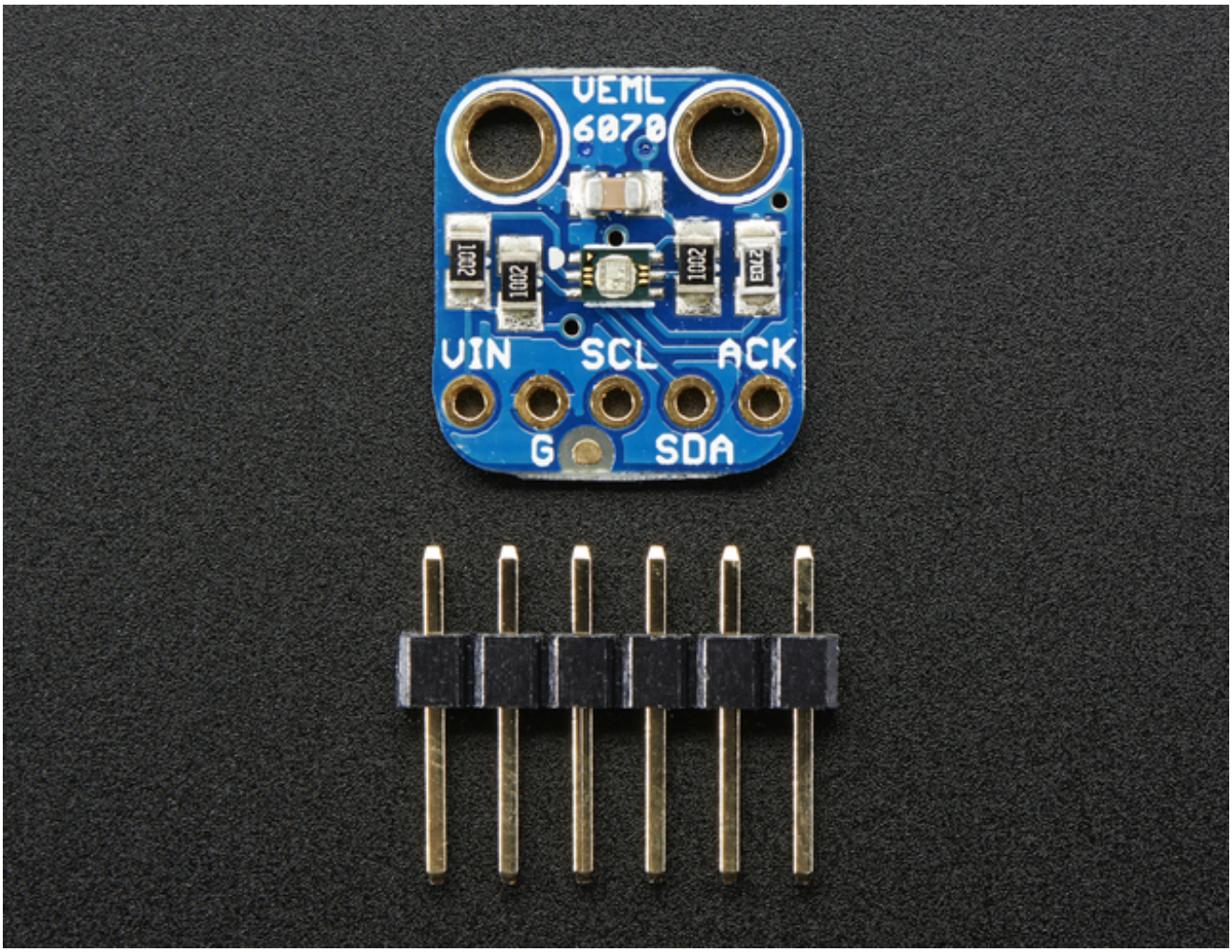
- **SCL** - I2C clock pin, connect to your microcontrollers I2C clock line. This pin can be used with 3V or 5V logic, and there's a 10K pullup on this pin.

- **SDA** - I2C data pin, connect to your microcontrollers I2C data line. This pin can be used with 3V or 5V logic, and there's a 10K pullup on this pin.

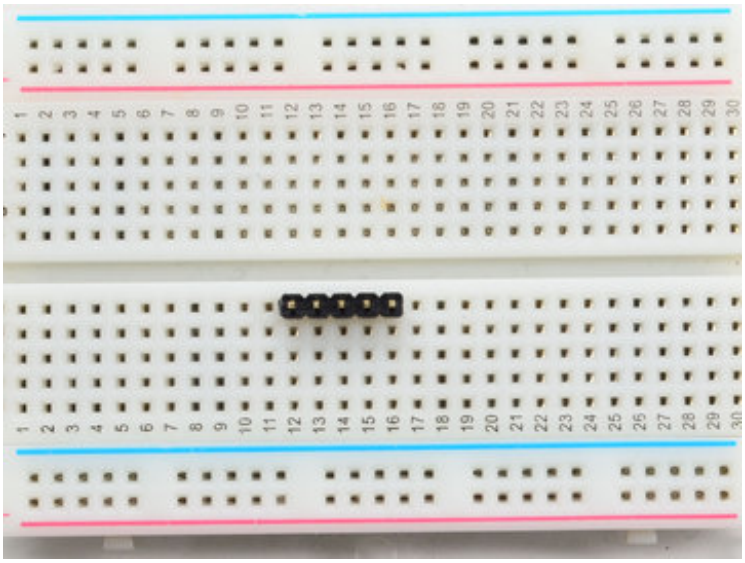
Other

- **ACK Pin** - This is the interrupt/alert output. You can set up the sensor to warn you on overly high or low UV signal. Logic level is the same as whatever you set Vin

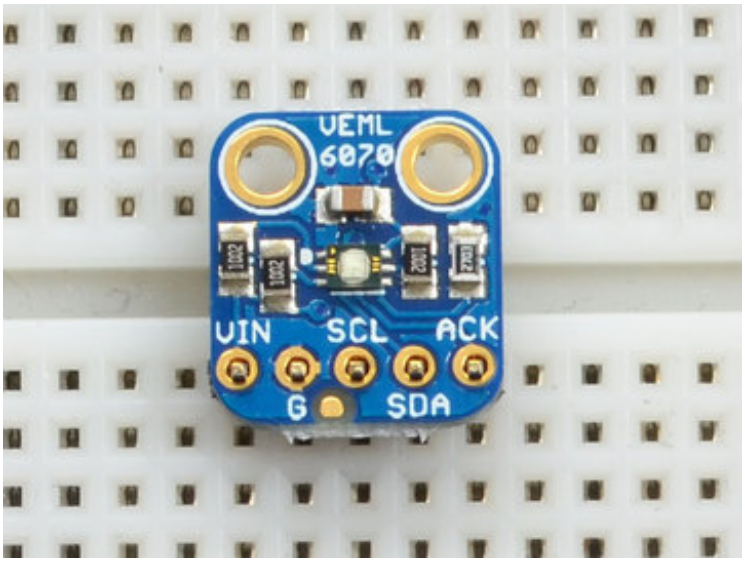
Assembly



Prepare the header strip:

- 

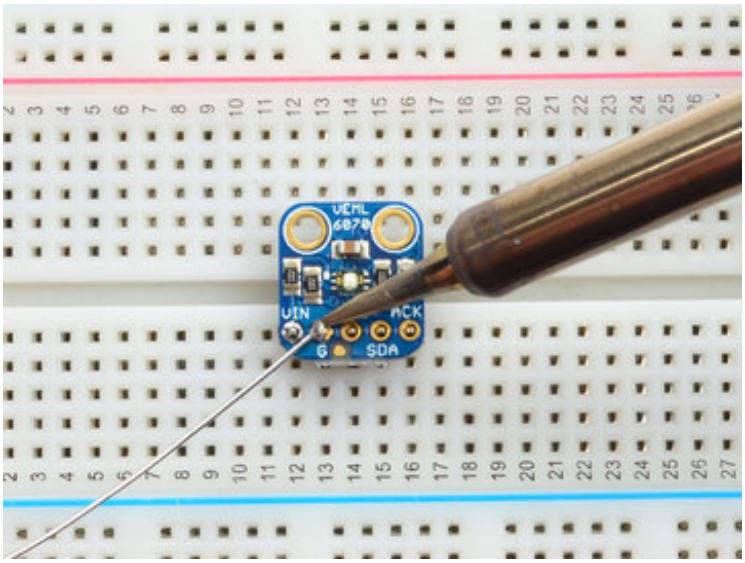
Cut the strip to length if necessary. It will be easier to solder if you insert it into a breadboard - **long pins down**

- 

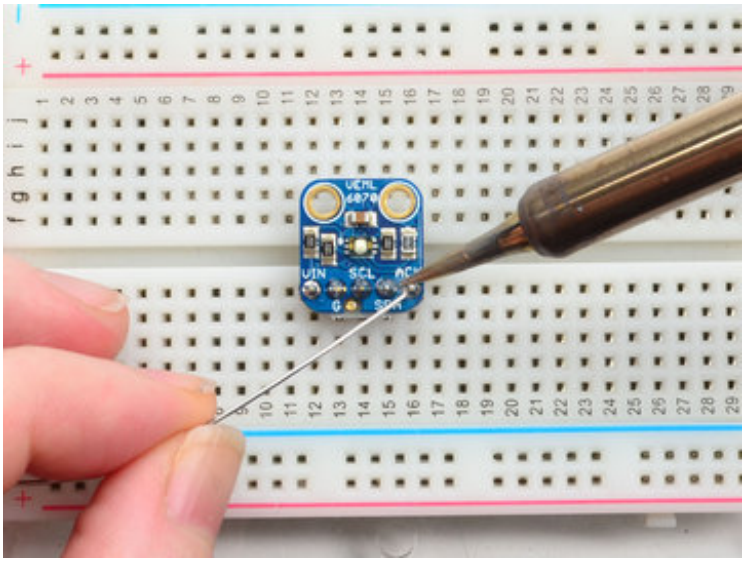
Add the breakout board:

Place the breakout board over the pins so that the short pins poke through the breakout pads

And Solder!

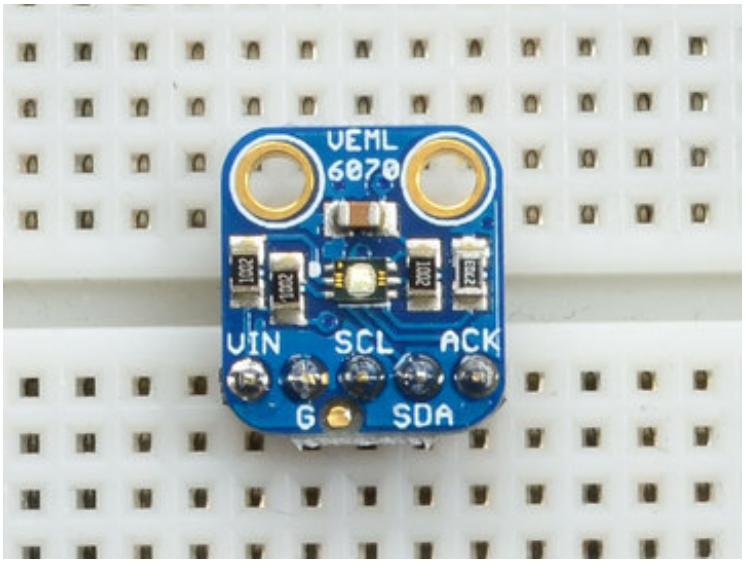
- 

  Be sure to solder all pins for reliable electrical contact.

- 

  Solder the longer power/data strip first

(For tips on soldering, be sure to check out our [Guide to Excellent Soldering](http://adafru.it/aTk)).

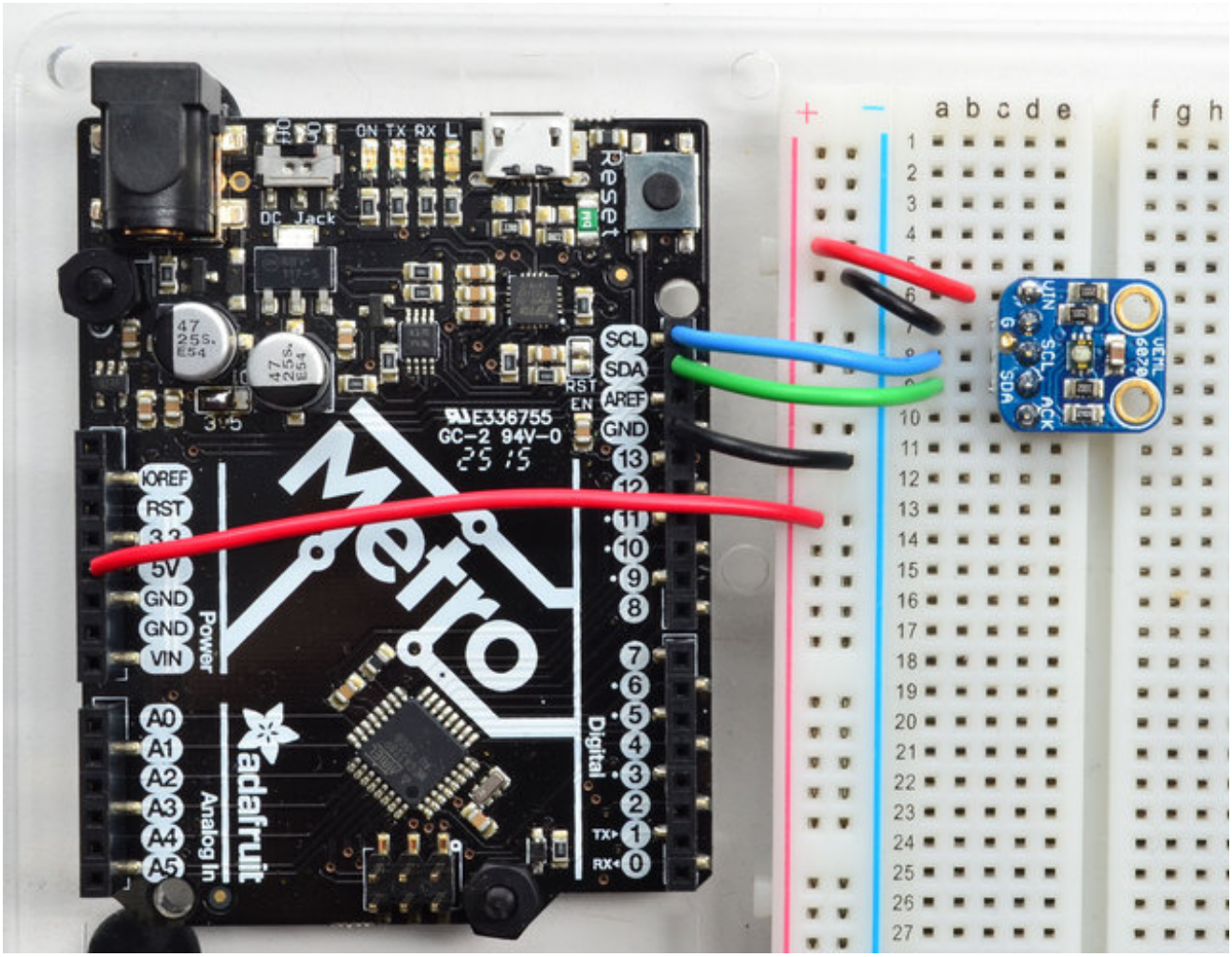
- 

You're done! Check your solder joints visually and continue onto the next steps

Wiring & Test

Wiring for Arduino

You can easily wire this breakout to any microcontroller, we'll be using an Arduino. For another kind of microcontroller, just make sure it has I2C capability, then port the code - its pretty simple stuff!



- Connect **Vin** to the power supply, 3-5V is fine. Use the same voltage that the microcontroller logic is based off of. For most Arduinos, that is 5V
- Connect **GND** to common power/data ground
- Connect the **SCL** pin to the I2C clock**SCL** pin on your Arduino. On an UNO & '328 based Arduino, this is also known as **A5**, on a Mega it is also known as**digital 21** and

on a Leonardo/Micro, **digital 3**

- Connect the **SDA** pin to the I2C data**SDA** pin on your Arduino. On an UNO & '328 based Arduino, this is also known as **A4**, on a Mega it is also known as**digital 20** and on a Leonardo/Micro, **digital 2**

Install Library

To begin reading sensor data, you will need to[download the Adafruit_VEML6070 Library from our github repository](http://adafru.it/nCd) (http://adafru.it/nCd). You can do that by visiting the github repo and manually downloading or, easier, just click this button to download the zip

[Download Adafruit_VEML6070](http://adafru.it/nCe)
http://adafru.it/nCe

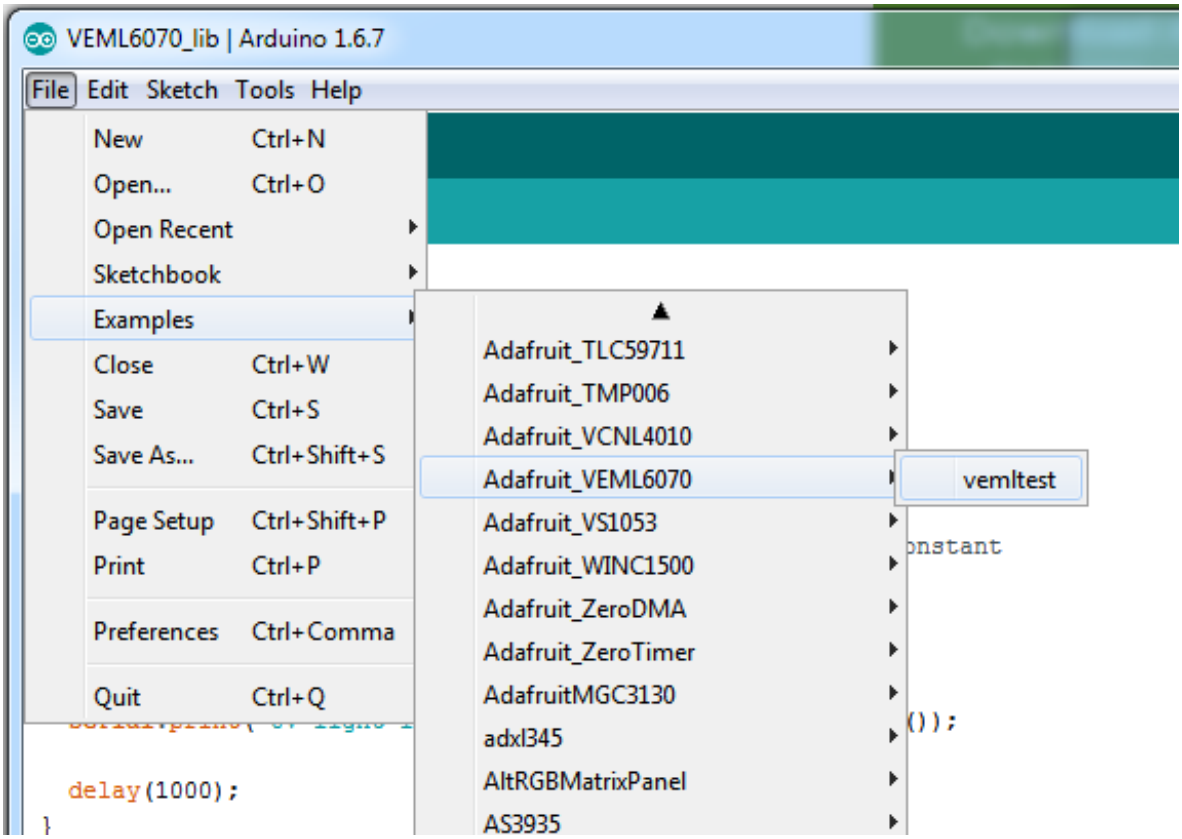
Rename the uncompressed folder **Adafruit_VEML6070** and check that the **Adafruit_VEML6070** folder contains **Adafruit_VEML6070.cpp** and **Adafruit_VEML6070.h**

Place the **Adafruit_VEML6070** library folder your **arduinosketchfolder/libraries/** folder. You may need to create the**libraries** subfolder if its your first library. Restart the IDE.

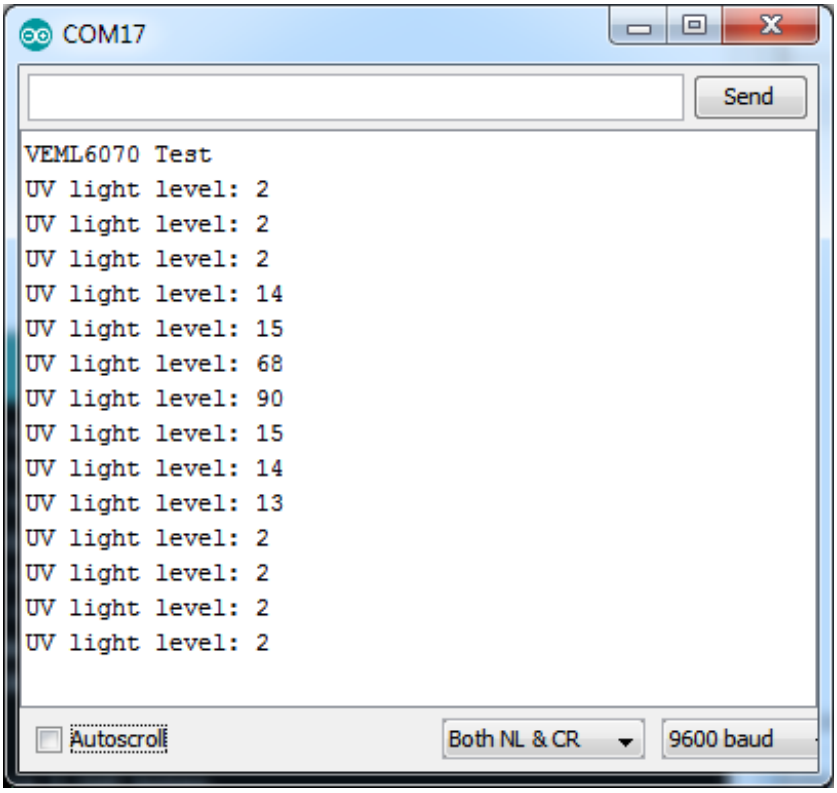
We also have a great tutorial on Arduino library installation at:
http://learn.adafruit.com/adafruit-all-about-arduino-libraries-install-use (http://adafru.it/aYM)

Load Demo

Open up **File->Examples->Adafruit_VEML6070->vemltest** and upload to your Arduino wired up to the sensor



Upload to the Arduino and open up the serial console at**9600 baud** to see the UV data output. Note that this is not UV index, its just UV light intensity!



If you're integrating this sensor into your project, its fairly easy to do.

Start by instantiating the sensor with:

```
Adafruit_VEML6070 uv = Adafruit_VEML6070();
```

Note that since this a pure I2C sensor, there's not pin configuration for instantiation

Next, you will call **begin()** in your setup procedure. There are 4 different 'integration' times used to calculate the intensity. The longer the integration time, the more light is collected. Use shorter integration times if you want to get measurements quickly with less precision. Longer times will give you more precision but of course, take longer!

- **VEML6070_HALF_T** ~62.5ms
- **VEML6070_1_T** ~125ms
- **VEML6070_2_T** ~250ms
- **VEML6070_4_T** ~500ms

Pass the integration time constant into **begin** like:

```
uv.begin(VEML6070_1_T)
```

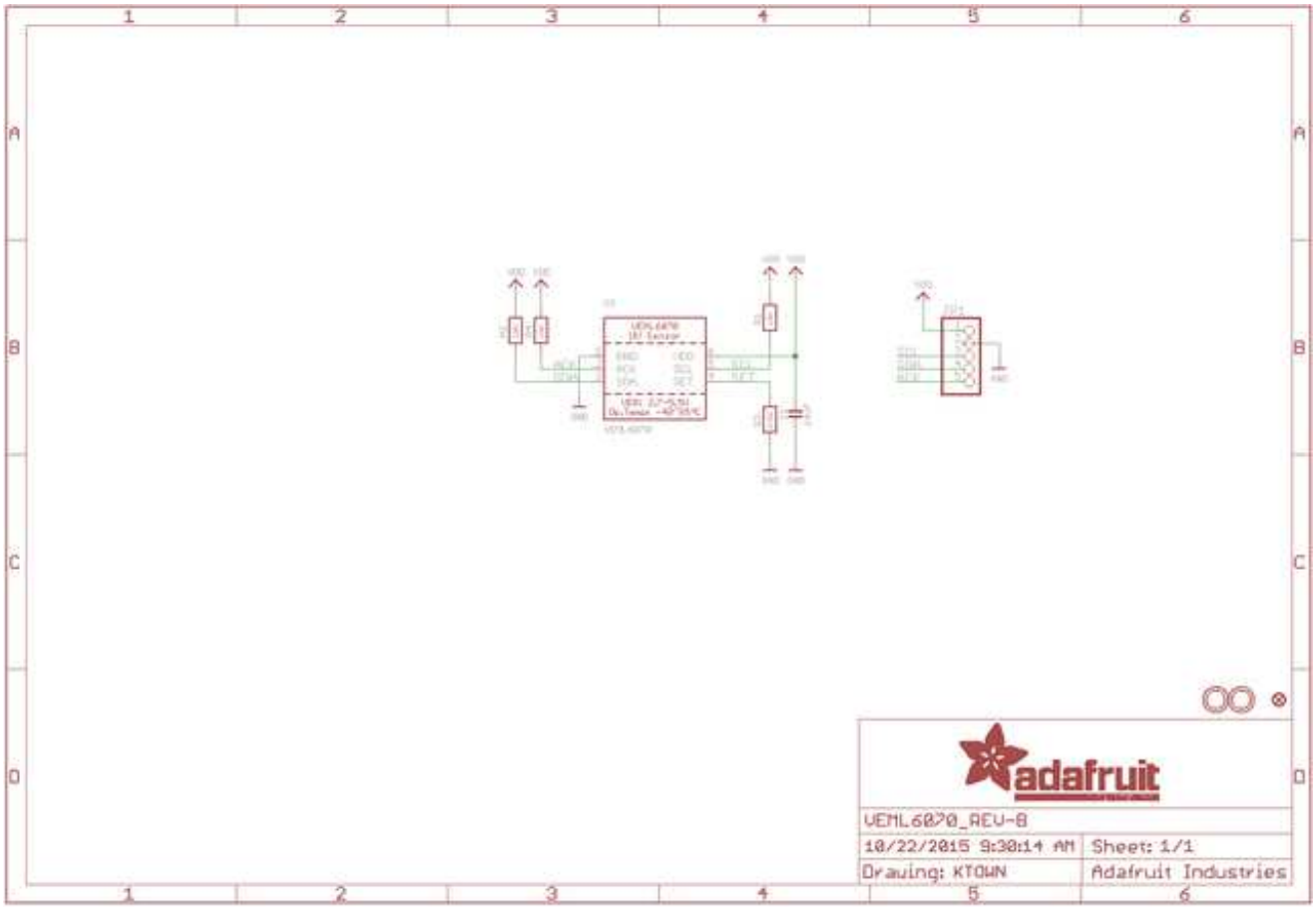
Then you can call **readUV** which will give you a 16-bit value relating to how much UV was detected. Again, this is not an UV index value, its unitless. You may need to calibrate the value against a known value depending on your usage!

Downloads

- PCB files at https://github.com/adafruit/Adafruit-VEML6070-PCB (http://adafru.it/nCi)
- Library files at https://github.com/adafruit/Adafruit_VEML6070 (http://adafru.it/nCd)
- Fritzing object available in the Adafruit Fritzing Library (http://adafru.it/aP3)
- VEML6070 Datasheet (http://adafru.it/rsE)

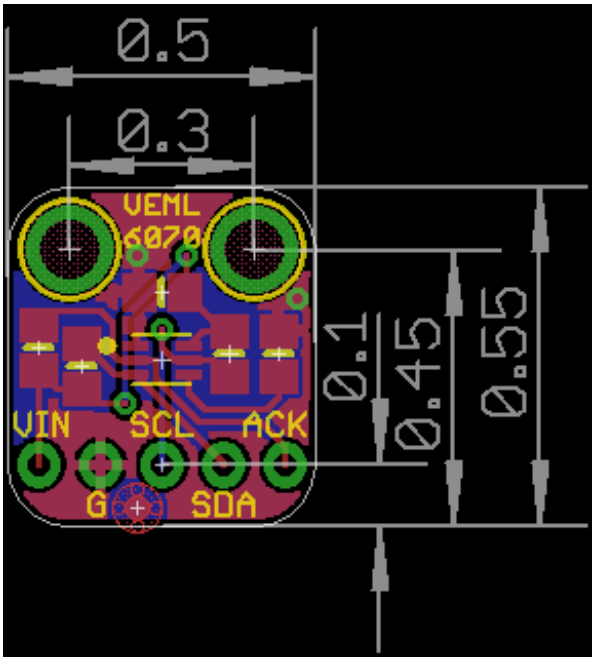
Schematic

Click to embiggen



Fabrication Print

Dimensions in inches


0.5
0.3
VEML
6070
VIN
SCL
ACK
G
SDA
0.1
0.45
0.55