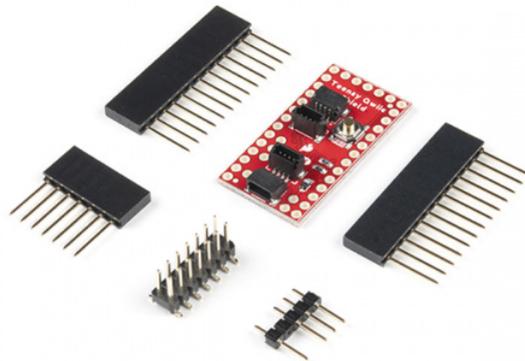


# SparkFun Qwiic Shield for Teensy Hookup Guide

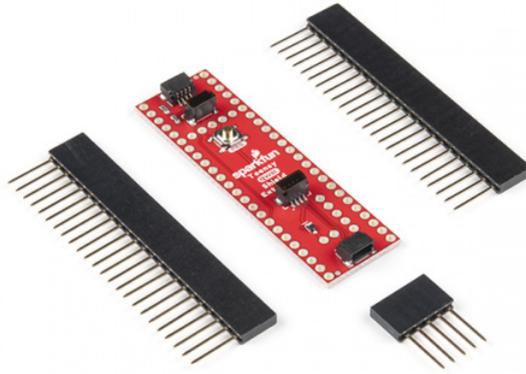
## Introduction

The SparkFun Qwiic Shield for Teensy and SparkFun Qwiic Shield for Teensy Extended provide an easy-to-assemble way to add the SparkFun Qwiic ecosystem to Teensy development boards. Both of these shields connect the I<sup>2</sup>C bus (GND, 3.3V, SDA, and SCL) on your Teensy to four SparkFun Qwiic connectors. The Qwiic ecosystem allows for easy daisy chaining so, as long as your devices are on different addresses, you can connect as many Qwiic devices as you'd like.



SparkFun Qwiic Shield for Teensy

© DEV-17119



## SparkFun Qwiic Shield for Teensy - Extended

© DEV-17156

### Product Showcase: SparkFun Qwiic Shield for Teensy



### Required Materials

To follow along with this tutorial, you will need a Teensy development board with either the "standard" or "extended" form factor. Here are is a collection of the compatible boards. Note, some of them come with headers pre-populated, so keep that in mind when considering which headers to populate on your shield.



Teensy 4.1  
● DEV-16771



Teensy 4.0  
● DEV-15583



Teensy 4.1 (Headers)  
● DEV-16996



Teensy 4.0 (Headers)  
● DEV-16997

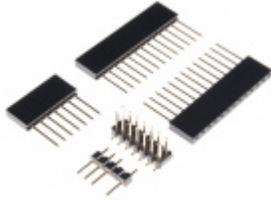
The Qwiic Shield includes a set of stackable headers to fit the Teensy footprint but you may also need some headers to solder to your Teensy. Or if you would prefer to use another header type for your shield assembly we've listed a few options below:



Break Away Headers - Straight  
● PRT-00116



Female Headers  
● PRT-00115



## Teensy Header Kit

● PRT-13925

Now you probably would not want the Qwiic Shield for Teensy if you didn't have any Qwiic products to use with it, right? Well, if you don't have any Qwiic products, the following might not be a bad place to start:



## SparkFun GPS Breakout - NEO-M9N, U.FL (Qwiic)

● GPS-15712



## SparkFun 16x2 SerLCD - RGB Text (Qwiic)

● LCD-16397



## SparkFun Qwiic Motor Driver

● ROB-15451



## SparkFun Cryptographic Co-Processor Breakout - ATECC508A (Qwiic)

● DEV-15573

You will need some of our Qwiic cables to connect your devices to the shield. Below are a few options:



Qwiic Cable - 500mm  
● PRT-14429



Qwiic Cable - 100mm  
● PRT-14427



Qwiic Cable - 200mm  
● PRT-14428



Qwiic Cable - 50mm  
● PRT-14426

Lastly, if you want to use a non-Qwiic I<sup>2</sup>C device, these adapters help to convert it to a Qwiic connector:



Qwiic Cable - Breadboard Jumper (4-pin)  
● PRT-14425



SparkFun Qwiic Adapter  
● DEV-14495



Qwiic Cable - Female Jumper (4-pin)

## Required Tools

You will need a soldering iron, solder, and general soldering accessories to solder the header pins to the Qwiic shields:



Solder Lead Free - 15-gram Tube

● TOL-09163



Soldering Iron - 30W (US, 110V)

● TOL-09507

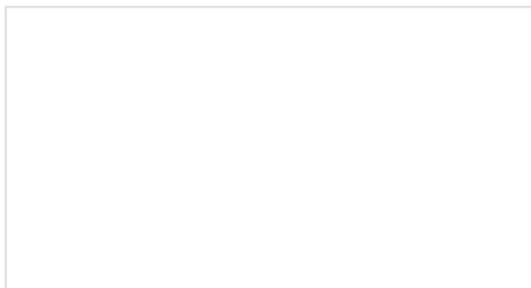
## Suggested Reading

If you aren't familiar with the Qwiic system, we recommend reading here for an overview:



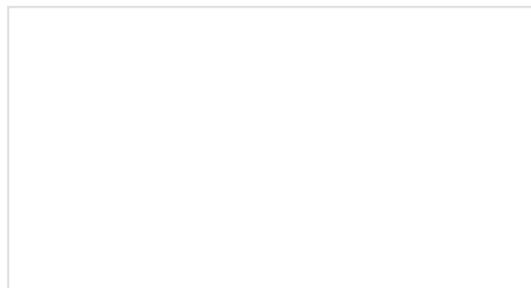
*Qwiic Connect System*

We would also recommend taking a look at the following tutorials if you aren't familiar with them:



### How to Solder: Through-Hole Soldering

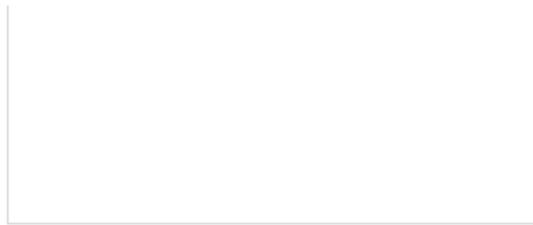
This tutorial covers everything you need to know about through-hole soldering.



### I2C

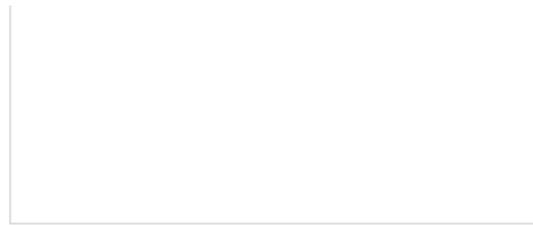
An introduction to I2C, one of the main embedded communications protocols in use today.





## Getting Started with the Teensy

Basic intro to the Teensy line of products, with soldering and programming suggestions.



## Arduino Shields v2

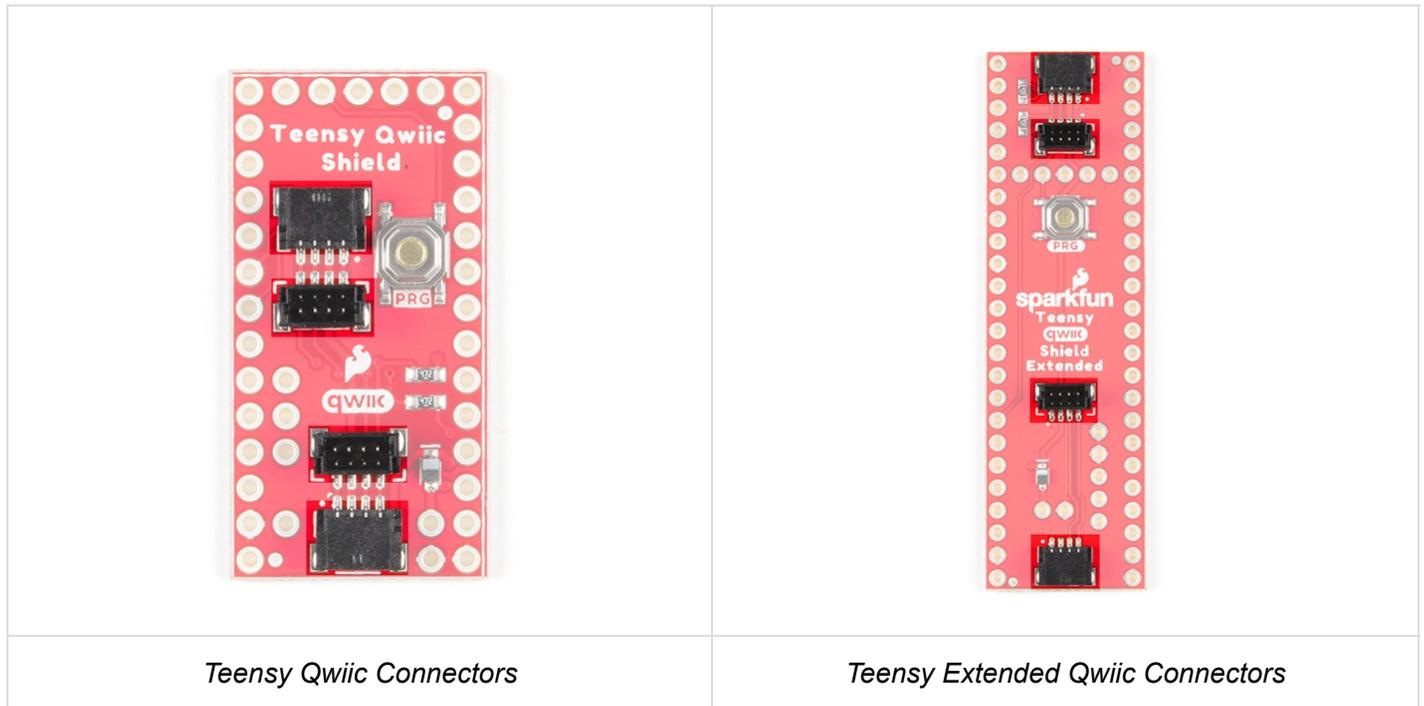
An update to our classic Arduino Shields Tutorial! All things Arduino shields. What they are and how to assemble them.

## Hardware Overview

### Qwiic Connectors

The Qwiic Shields for Teensy each have four Qwiic connectors on them. The two on the edges are the standard horizontal connectors and the two in the middle are vertical connectors.

Note, the horizontal Qwiic connector on the "top" (aka North end) of the non-extended version is positioned slightly downward to allow space for proper cable insertion, and to avoid any conflicts with the nearby 6-pin header on the edge of the board.



### Program Button

Each of these shields have a "PROG" button. This is to allow easier access to a programming button for each time you want to upload to the Teensy. Note, it is electrically in parallel with the "PROG" button on the Teensy boards themselves. This means that you can choose to use either the button on your Teensy or the button on the shield. If your shield is located on top of your Teensy (using stack-able headers), then it will be much more accessible to use the button on the shield, rather than trying to reach under the shield.

 <p>The image shows a red Teensy Qwiic Shield PCB. It features a Qwiic connector at the top, a PRG (Program) button in the center, and a USB-C connector at the bottom. The text "Teensy Qwiic Shield" is printed at the top, and "QWIIC" is printed near the connector.</p>	 <p>The image shows a red Teensy Qwiic Shield Extended PCB. It features a PRG (Program) button at the top, a Qwiic connector in the middle, and a USB-C connector at the bottom. The text "sparkfun Teensy Qwiic Shield Extended" is printed in the center.</p>
<p><i>Teensy Program Button</i></p>	<p><i>Teensy Extended Program Button</i></p>

**I<sup>2</sup>C Jumper**

This jumper is a little different than our normal I<sup>2</sup>C pull up jumpers as it is **open** by default. The jumper only needs to be closed if your attached I<sup>2</sup>C device does **not** have pull up resistors. Essentially all SparkFun I<sup>2</sup>C breakouts come with pull up resistors on them so if you are using a Qwiic I<sup>2</sup>C device or another SparkFun I<sup>2</sup>C device, you can most likely leave it open. When closed, the SDA and SCL lines are pulled to **3.3V** by **4.7KΩ** resistors. If you have never worked with solder jumpers before, check out this tutorial for some tips and tricks for working with them.

 <p>The image shows a red Teensy Qwiic Shield PCB with an I<sup>2</sup>C jumper. The jumper is a small component with three pins, labeled "I2C". Other labels on the board include "SDA", "SCL", "D1BP", "ISO", "3V3", "ALT 3V3", and "GND".</p>	 <p>The image shows a red Teensy Qwiic Shield Extended PCB with an I<sup>2</sup>C jumper. The jumper is a small component with three pins, labeled "I2C". Other labels on the board include "SDA", "SCL", "D1BP", "ISO", "3V3", "ALT 3V3", and "GND".</p>
<p><i>Teensy I<sup>2</sup>C Jumper</i></p>	<p><i>Teensy Extended I<sup>2</sup>C Jumper</i></p>

**External Power Input**

These shields include an optional **3.3V** power input. The **3.3V** pin off of the Teensy is rated to supply **250mA**. If your project requires more than that on the Qwiic **3.3V** power rail, then you should consider supplying a separate power source and soldering it into the header pins labeled "ALT 3V3". Note, you must also cut the jumper labeled "ISO" to properly isolate the Teensy's **3.3V** power rail from your external.

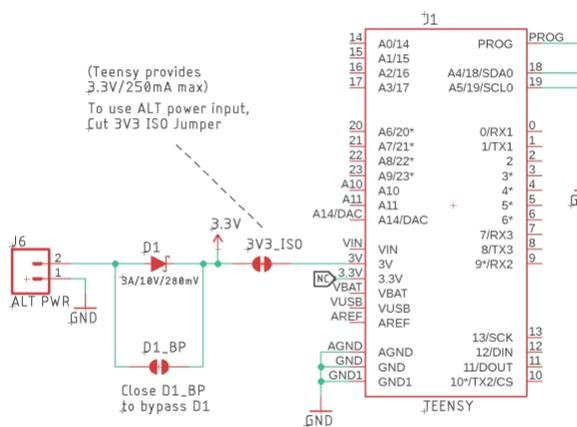


*Optional External Power Input*

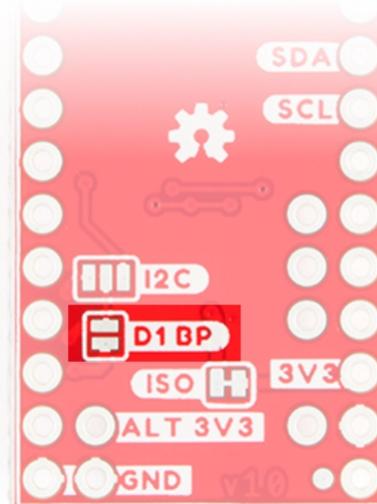


*Extended Optional External Power Input*

Note, when using the external power input header, you may notice a slight voltage drop. This is because we have included a protective diode in the circuit. For most applications, this will be fine to leave in place. For more advanced users, we have included a bypass jumper to easily bypass this diode and have a direct connection to the **3.3V** power net.



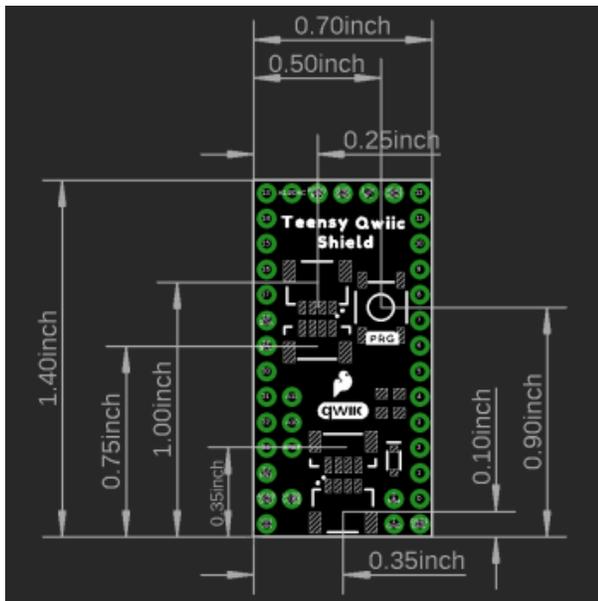
*Schematic highlight*



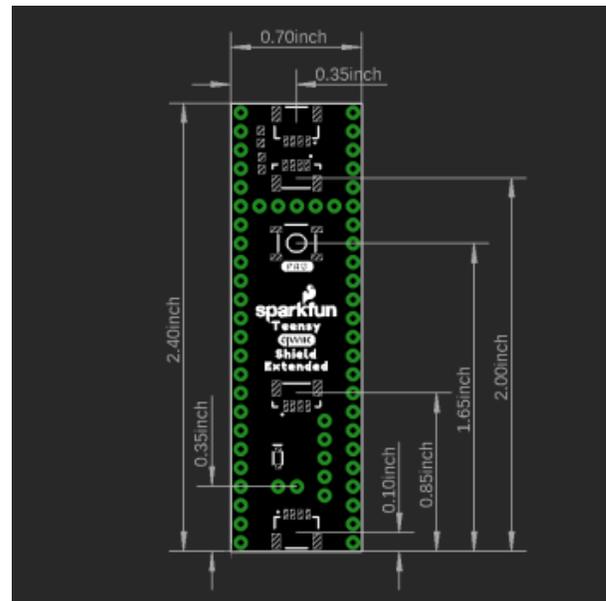
*External power input header and bypass jumper*

## Board Dimensions

The Qwiic Shield for Teensy measures 0.70in x 1.40in (17.78mm x 35.56mm). The extended version measures 0.70in x 2.40in (17.78mm x 60.96mm). Note, because these are such small form factor boards, they do not have any standoff holes. They simply rely on the headers for both electrical connections and "mounting hardware".



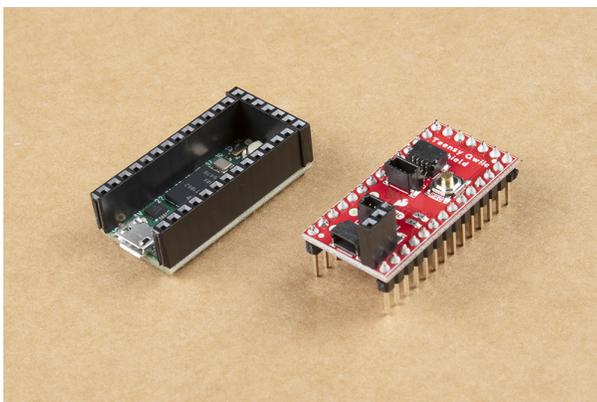
*Qwiic Shield for Teensy Dimensions*



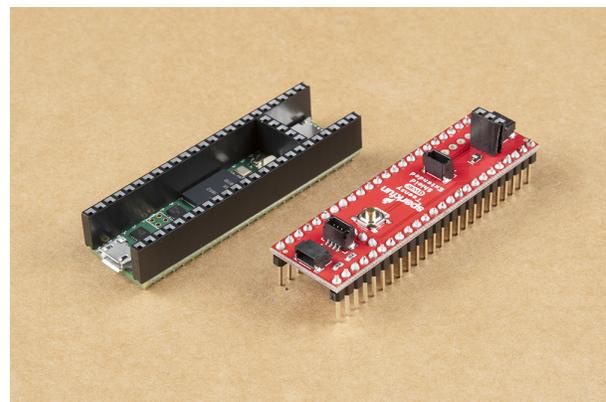
*Qwiic Shield for Teensy Extended Dimensions*

## Hardware Assembly

To get started using the Qwiic Shield for Teensy, solder the headers onto your Teensy board and your Qwiic Shield. You may choose to use the included stackable header kit or any combination of male/female breakaway headers. Below we show a couple options using standard breakaway headers. Note, for best access to the program button on the shield and the two vertical Qwiic connectors, it is best to have it be the top of your stack.



*Teensy 4.0 and shield with M/F headers soldered into place.*

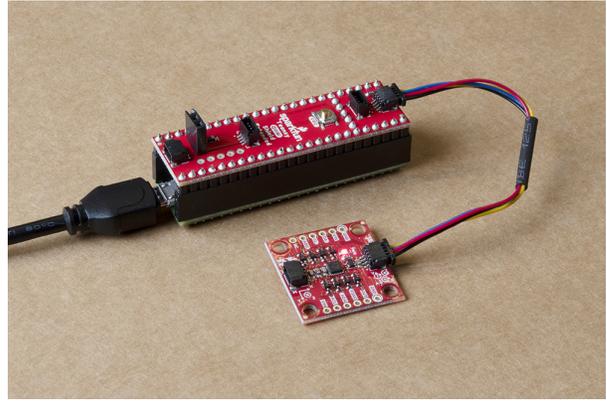


*Teensy 4.1 and extended shield with M/F headers soldered into place.*

Once you have soldered headers to your shield and connected it to your Teensy, it's time to start connecting Qwiic devices! Below you can see an example of each shield connected to the appropriate Teensy (4.0 or 4.1). Here we used our standard breakaway headers along with a couple of Qwiic Devices chained to it.

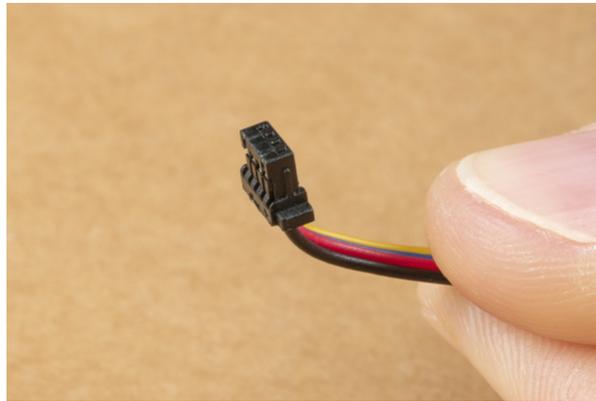


*Teensy Example Hookup*



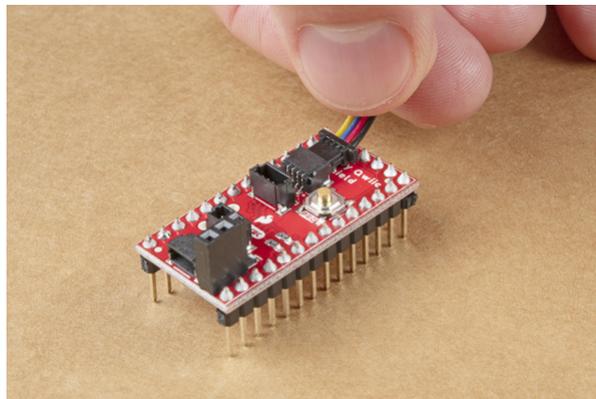
*Teensy Extended Example Hookup*

If you are using the upper-most qwiic connector on the Qwiic Shield for Teensy, please check out the following tips. It helps to bend/curl your Qwiic cable a bit before inserting it into the right-angle connector on the shield.



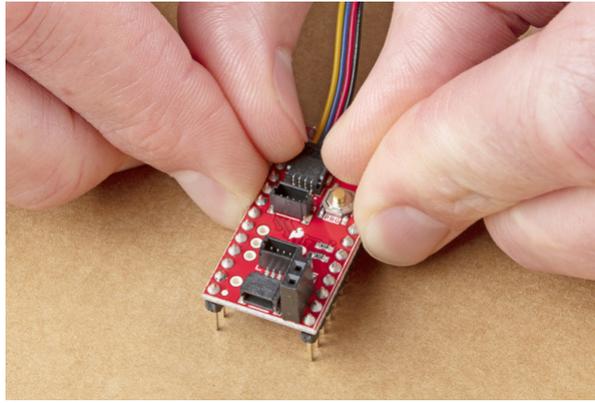
*Qwiic Cable with a bend.*

With the bend in place, you can better align it before inserting it all the way.



*Initial alignment.*

To avoid stressing the cable wires, it is best to push the Qwiic connector using your fingernails on the sides of the connector plastic. Tweezers can also do the trick.



*Pressing on the sides of the plastic is ideal.*

## Resources and Going Further

That's a wrap! Your Qwiic Shield for Teensy/Teensy Extended is now ready to connect to any of a host of Qwiic devices SparkFun offers. For more information, take a look at the resources below.

### Qwiic Shield for Teensy

- [Schematic \(PDF\)](#)
- [Eagle Files \(ZIP\)](#)
- [Board Dimensions \(PNG\)](#)
- [GitHub Repository](#)

### Qwiic Shield for Teensy Extended

- [Schematic \(PDF\)](#)
- [Eagle Files \(ZIP\)](#)
- [Board Dimensions \(PNG\)](#)
- [GitHub Repository](#)

### Even More Resources

- [Qwiic System Landing Page](#)
- [SFE Product Showcase Video](#)
- [Getting Started with Teensy](#)

If you are having trouble getting your Qwiic devices to connect using your newly assembled Qwiic Shield, you may want to take a look at these tutorials for help troubleshooting and reworking your shield.

- [Troubleshooting Tips - Hardware Checks](#)
- [Arduino Shields Tutorial](#)

Now that you have your Qwiic Shield ready to go, it's time to check out some Qwiic products. Below are a few to get started.



SparkFun Qwiic Scale - NAU7802

● SEN-15242



SparkFun Thing Plus - XBee3 Micro (Chip Antenna)

○ WRL-15454



SparkFun Qwiic Quad Solid State Relay Kit

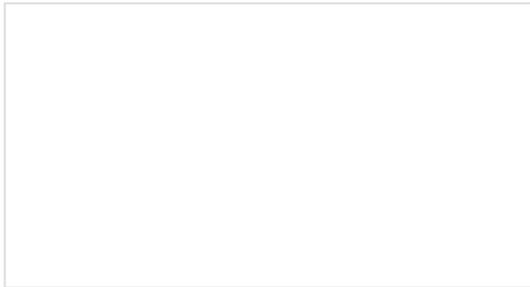
● KIT-16833



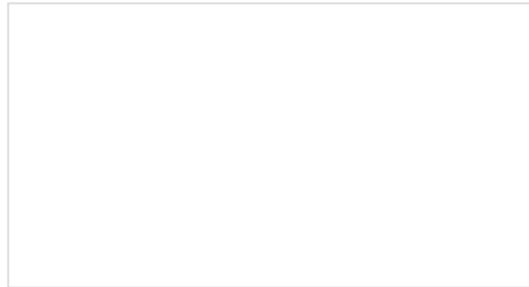
SparkFun Qwiic Button - Green LED

● BOB-16842

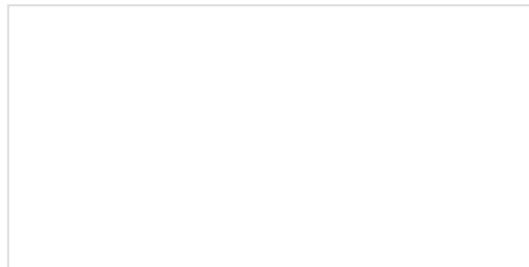
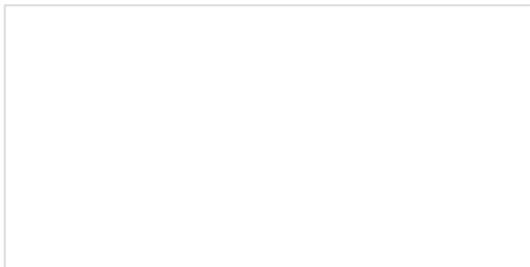
Before you go, here are some other tutorials using the Qwiic Connect System you may want to look through:



**SparkFun Pro nRF52840 Mini Hookup Guide**  
A hardware overview and hookup guide for the SparkFun Pro nRF52840 Mini -- a breakout for Nordic's impossibly cool Bluetooth/ARM Cortex M4 SoC.



**Hookup Guide for the BlackBoard Artemis**  
Get started with the BlackBoard Artemis - all the functionality of the SparkFun Artemis module wrapped in the familiar Uno footprint



Programming the SparkFun Edge with Arduino  
Running low-power machine learning examples on the SparkFun Edge can now be done using the familiar Arduino IDE. In this follow-up to the initial Edge tutorial, we'll look at how to get three examples up and running without the need to learn an entirely new SDK.

SparkFun Qwiic Quad Solid State Relay Kit  
Hookup Guide  
A Hookup Guide to get you started with the SparkFun Qwiic Quad Solid State Relay Kit (say that five times fast!).