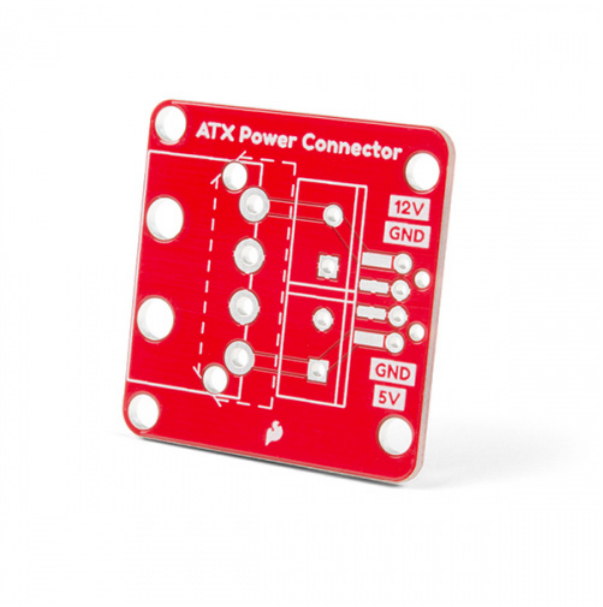
ATX Power Connector (4-Pin) Breakout Hookup Guide

Introduction

Do you need to power a project with 12V and 5V from one wall adapter? The ATX power connector breaks out the standard 4-pin computer peripheral port for your 12V and 5V devices!



SparkFun ATX Power Connector Breakout Board
BOB-15035

SparkFun ATX Power Connector Breakout Kit - 12V/5V (4-pin)

KIT-15701

Required Materials

To follow along with this tutorial, you will need the following materials that are included in the kit. The components can be ordered individually if you decide to solder header pins or wires directly to the board. You may not need everything though depending on what you have. Add it to your cart, read through the guide, and adjust the cart as necessary.

SparkFun ATX Power Connector Breakout Kit - 12V/5V (4-pin)
KIT-15701

Tools

You will need a soldering iron, solder, and general soldering accessories.

Soldering Iron - 60W (Adjustable Temperature)
TOL-14456

Solder Lead Free - 15-gram Tube
TOL-09163

Pocket Screwdriver Set
TOL-12891

Suggested Reading

If you aren’t familiar with the following concepts, we recommend checking out these tutorials before continuing.

How to Solder: Through-Hole Soldering

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

Connector Basics

Connectors are a major source of confusion for people just beginning electronics. The number of different options, terms, and names of connectors can make selecting one, or finding the one you need, daunting. This article will help you get a jump on the world of connectors.

What is a Circuit?

Every electrical project starts with a circuit. Don't know what a circuit is? We're here to help.

Electric Power

An overview of electric power, the rate of energy transfer. We'll talk definition of power, watts, equations, and power ratings. 1.21 gigawatts of tutorial fun!

Polarity

An introduction to polarity in electronic components. Discover what polarity is, which parts have it, and how to identify it.

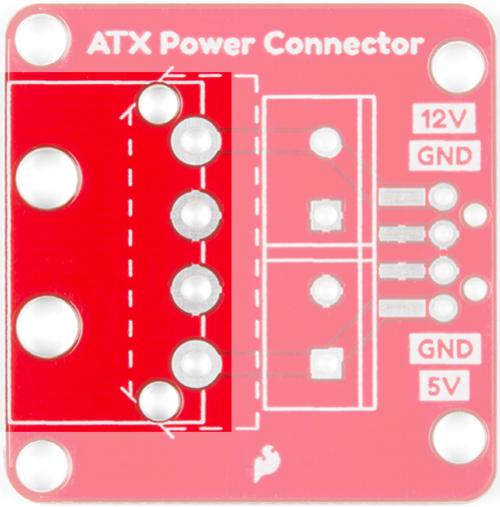
12V/5V Power Supply Hookup Guide

In this tutorial, we will replace the 12V/5V (2A) power supply's molex connector with two male barrel jacks adapters.

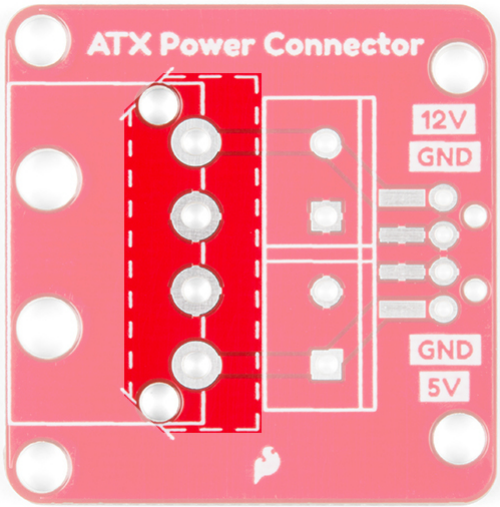
Hardware Overview

ATX Connector Side

The board has the option of soldering a 4-pin right angle ATX power connector.

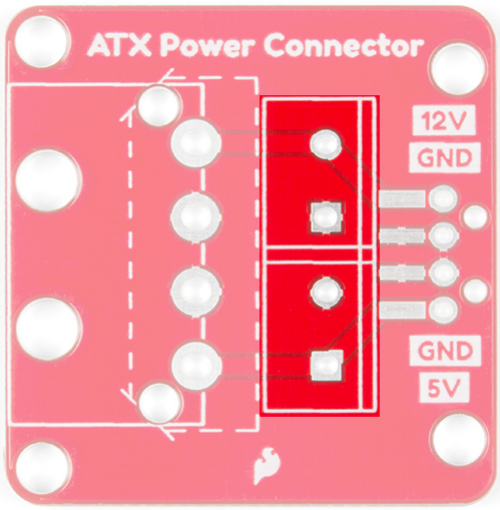


Depending on your application, you may want to add a vertical connector. Have no fear! The PTH pads were adjusted so that a 4-pin vertical connector can be added. Just follow the dashed silkscreen that outlines the perimeter of the connector.



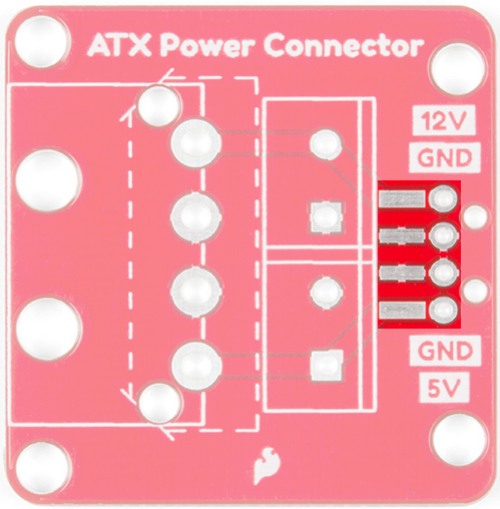
5mm Screw Terminals

On the output side of the breakout, there is a spot for two 2-pin 5mm screw terminals.



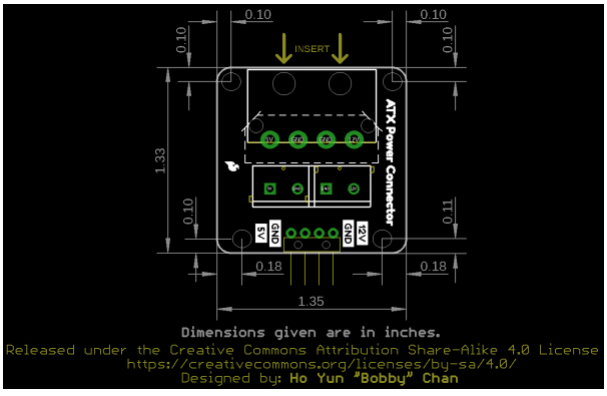
Breadboard Compatible Pins

There is also an option of adding vertical or SMD right angle header pins if you need to connect the breakout to a breadboard or jumper wires. Just keep in mind that the amount of current the headers can handle is less than the screw terminals.



Board Dimensions

The board is 1.33in x 1.35in and includes four mounting holes to secure the board on a panel or enclosure.



Hardware Assembly

You'll need to solder the connectors of your choice to the breakout. If you have not soldered before, check out our tutorial below for tips!

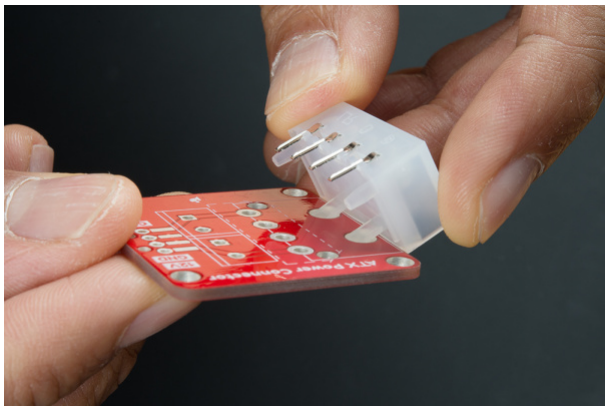
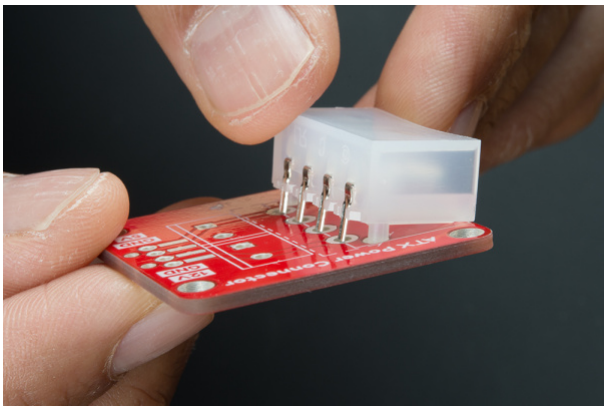
How to Solder: Through-Hole Soldering

SEPTEMBER 19, 2013

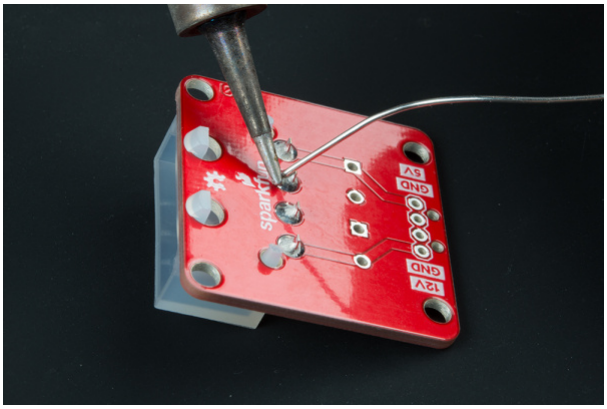
This tutorial covers everything you need to know about through-hole soldering.

Soldering the Input Connector

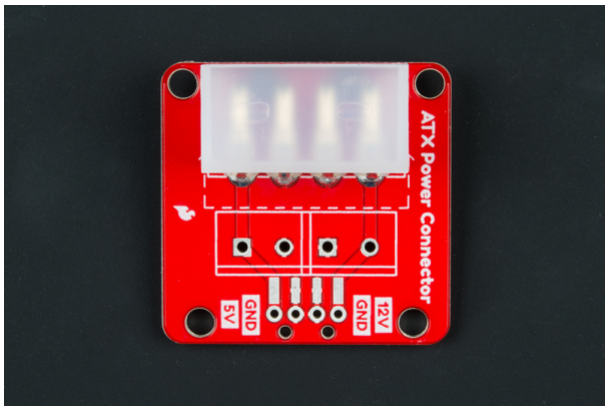
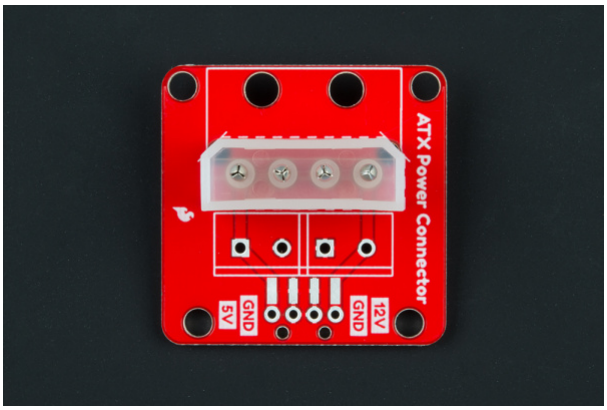
You'll need to decide on an ATX connector to solder on the breakout board. The board is compatible with both right angle and vertical connectors. We'll be using the right angle connector since the board is available in SparkFun's catalog. When inserting the right angle connector, make sure to insert the support legs first before inserting the pins into the through hole pads.

	
Insert Support Leg into Breakout	*Sliding Pins into Breakout*

Once you have chosen the ATX connector of your choice, solder each pin to the breakout.

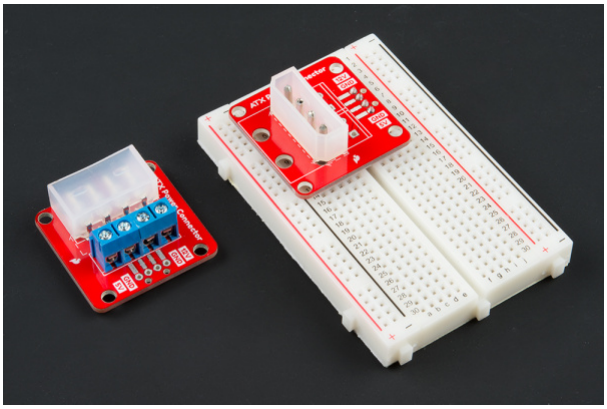


Your board should look similar to the image to the left for the right angle connector. If you happen to have a vertical connector from a different distributor, your board should look similar to the image on the right.

	
Right Angle Connector Soldered	*Vertical Connector Soldered*

Soldering the Output Connector

Depending on your application, you can solder screw terminals or header pins to the breakout. With the screw terminals you can easily secure fork connectors or wires. If you choose the screw terminal route, you may need to strip wires before tightening the screws down for each respective pin. Should you decide to solder straight header pins, you can insert the board into a breadboard or protoboard. There is also an option to solder right angle SMD headers to the board as well depending on your application. Below are a few configurations depending on the connector and header that you choose. Remember, the SparkFun catalog only has the right angle connector available.



Power Supply Options

Below are options where you will encounter the 4-pin connector.

ATX Power Supply

ATX power supplies usually have a number of power connectors available to power components for a desktop computer. The connector of interest in the image below is the second connector from the right. This 4-pin power connector is intended to power 12V and 5V computer peripherals (such as disk drives). Depending on the manufacturer of the power supply, the quantity of each connector can vary. If you want to grab some juice for your project from this type of power supply, you'll need to connect the breakout board to this port.

Image Courtesy of User "Smial" on Wikipedia

Heads up! Depending on your power supply (especially older ones), the voltage may become unstable or turn off unless there is a minimum "dummy" load. If you are using only one side of the voltage, make sure to check the datasheet and ensure that you are meeting the minimum load requirement. For more information, check out this article below.

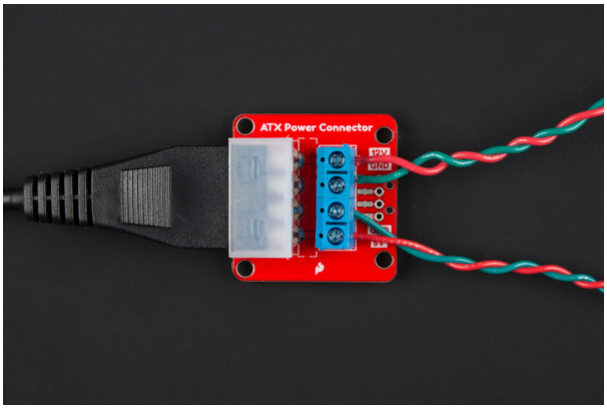
- Make: Projects - Computer Power Supply to Bench Power Supply Adapter
- Instructables: Convert a Computer Power Supply to a Variable Bench Top Lab Power Supply

In most cases, a minimum of about 10Ω 10Watt power resistor is needed. Otherwise, just use Ohm's Law and calculate the amount of power that the power resistor will absorbing to ensure that it can handle the current. Depending on your power supply, the power resistor can become hot so make sure to use a heat sink and enough air flow to dissipate the heat. You can also add a few of power resistors in parallel.

Power Resistor Kit - 10W (25 pack)
KIT-13053

12V/5V (2A) Power Supply

Certain wall adapters also take advantage of this standard 4-pin port like the 12V/5V (2A) power supply in the catalog. If your project requires either/both 12V and 5V for power you can also connect the breakout board to this power supply.



Heads up! If you are using only one of the voltages from the 12V/5V power supply, the other side may become unstable if there is not a minimum load (10mA) just like the note in the ATX power supply above. Depending on your project, you may need to add load in order for the voltage to become stable for long term installations. When testing it out with a multimeter without a load on both sides, the voltages appeared to be stable.

A minimum of about 10Ω 10Watt power resistor is needed if you are seeing this instability. In most cases, a minimum of about 10Ω 10Watt power resistor is needed. Otherwise, just use Ohm's Law and calculate the amount of power that the resistor will absorbing to ensure that it can handle the current. Depending on your power supply, the power resistor can become hot so make sure to use a heat sink and enough air flow to dissipate the heat. You can also add a few of power resistors in parallel.

Power Resistor Kit - 10W (25 pack)
KIT-13053

Examples

Once you have chosen your ATX power supply, you're ready to give your project some life! You can use the board to help power your microcontroller and LEDs from either side depending on your application. Check out the following tutorials below for examples of using a 12V/5V power supply.

RGB Panel Hookup Guide

Make bright, colorful displays using the 32x16, 32x32, and 32x64 RGB LED matrix panels. This hookup guide shows how to hook up these panels and control them with an Arduino.

Touch Potentiometer Hookup Guide

Learn how to use the SparkFun Touch Potentiometer to control lighting, volume or other inputs in your daily life.

Large Digit Driver Hookup Guide

Getting started guide for the Large Digit display driver board. This tutorial explains how to solder the module (backpack) onto the back of the large 7-segment LED display and run example code from an Arduino.

Building a Safe Cracking Robot

How to crack an unknown safe in under an hour.

Resources and Going Further

For more information, check out the resources below:

- Schematic (PDF)
- Eagle Files (ZIP)
- Board Dimensions
- Power Supply Datasheet (PDF)
- Tutorials
    - Make: Projects - Computer Power Supply to Bench Power Supply Adapter
    - Instructables: Convert a Computer Power Supply to a Variable Bench Top Lab Power Supply
- GitHub
- SFE Product Showcase

Need more inspiration for your next project? Check out some of these related tutorials that uses the 12V/5V (2A) power supply.

How to Build a Remote Kill Switch

Learn how to build a wireless controller to kill power when things go... sentient.

12V/5V Power Supply Hookup Guide

In this tutorial, we will replace the 12V/5V (2A) power supply's molex connector with two male barrel jacks adapters.

Or check out some of these blog posts about power supplies.

Power Supply Protection

JANUARY 13, 2009

Enginursday: Supplies!

DECEMBER 10, 2015

Friday Product Post: All's Well That Means Well

MARCH 24, 2017

Enginursday: 60 USB Chargers in Parallel

MAY 25, 2017

Enginursday: More Fun with 60 USB Supplies

JULY 6, 2017