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Using a Breadboard

by [M-Short](#) | December 03, 2010 | [12 comments](#)

Skill Level: ☆ Beginner

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What is a solderless breadboard and why would you want one? Solderless breadboards, or just breadboards for short, are handy little boards that make prototyping easy. You can insert most components as well as add wire to connect these components. Often you will want to make a more permanent version later, but sometimes you want your project to be easily modifiable or maybe your breadboard is just the right size for your project. Either way breadboards make wiring up, testing, fixing, retesting, and using your very own circuits easy and convenient.



Image A (basic breadboard with labeled features)

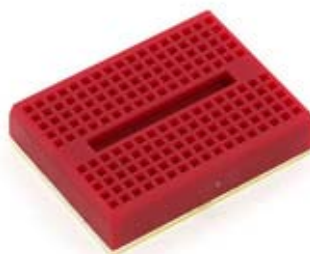


Image B (top of our small breadboard)

There are many different types of breadboards (see image A), some small (see image B), some large, and some in between. The basic breadboard has 5 different features, not all boards will have these features and some will have more.

1. Terminal Strips
2. Power Rails
3. DIP package support
4. Binding Posts
5. Not for human consumption

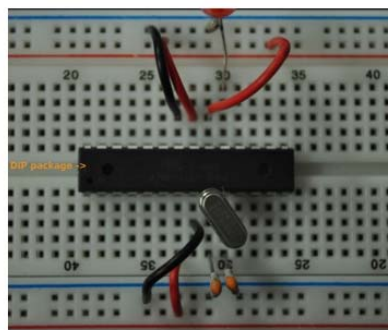


Image C (bottom of small breadboard with backing removed)

Image D (small circuit with DIP package)

**Terminal Strips** - Basically a breadboard consists of rows of holes that you can connect with pieces of wire. There is usually a divide in the middle of the board separating the 2 sides. Each row is basically a strip of metal and when you plug a wire into a hole it makes contact with that strip (see image C) which connects it with everything else you plugged into that strip.

**Power Rails** - Most breadboards also have rows running down the edges with red and blue (or black) strips running next to them. These are for running power. When you have large circuits, you are commonly going to need power and ground and having them run along the sides of the board is very convenient. Be careful though, because the 2 sides are usually not connected and larger boards often break up the row into 2 parts (great for when some stuff needs 5V and other stuff needs 12V).

**DIP package support** - See the little blank space in the middle (image D)? This allows you to put **DIP** (Dual In-line Package) ICs into your board. DIP packages are about 6.25mm wide with various lengths and should fit perfectly over this space. Because each side of the board is separated each pin on the DIP package has its own row for you to connect to.

**Binding Posts** - Basically these allow you to hook up an external power source. By default the posts are not connected to anything. It is up to you to connect them to the power rails or where ever you need them.

Sample Question:

Why would you want to use a breadboard?

- To solder components on
- To test your circuit
- To insert under your skin
- To cut your bread and cheese on for lunch

The official answer is 'b' although depending on the breadboard you have 'd' might be useful as well.

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-  **Member #105041** | about 2 years ago 2

Can we get a breadboard 2 tutorial? A breadboard can be confusing to a beginner who is trying to route power through them. A simple light an LED example would be good just to show how to move power from the power rail and how to get back to the ground rail. Nothing elaborate but for a newbie it would help them tremendously to see how power is transferred from terminal strip to terminal strip and to clarify what points on the board are now hot. Thanks for the tutorial. You guys don't have to provide this at all but this is what sets you apart from

your competition.

-  Member #735 | about 2 years ago 1

<http://www.sparkfun.com/products/9567>

-  Member #25105 | about 2 years ago 2

Sadly, as of 1/13/2011, this article is incorrect. The article confuses “breadboard” with “solderless breadboard” (a), (b), and (d) are all correct answers.

Originally, breadboards were just that — wooden cutting boards. You’d put brass thumbtacks in them, and solder wires to those. It works surprisingly well — I’ve built circuits this way — but it’s fairly expensive, and finding real brass thumbtacks is a bitch.

A few steps forward in evolution, people made boards with holes (typically 100mil spacing). You’d stick components on top, wires through the holes, and solder on the bottom. Later, people added pads, and sometimes traces to those boards. Enter the modern (solder) breadboard. SparkFun sells these under the name “ProtoBoard” (which is funny, because prior to SparkFun, “protoboard” referred specifically to solderless breadboards of the modern variety).

A number of people made a number of types of solderless breadboards. These have the advantage of re-usability of components, and easy modification. There was a whole bunch of hokey schemes to do this (anything from nut-and-bolt terminals holding wires in place, to springs where wires would go between the coils), but eventually, the modern plugboard won out.

That’s what this article is about. Solderless breadboards. Generically, “breadboard” refers to a slew of different types of soldered and solderless prototyping boards.

-  MattCF | about a year ago 3

Ummmmmm to me breadboards have allways been this and you had to solder protoboards

-  Member #165456 | about 2 years ago 1

If using the bread board don’t forget to account for resistance on the board. I also made a circuit and the capacitance of the board actually messed up the readings.

-  Cameri | about 2 years ago 1

Indeed. Breadboards are NOT suitable for high speed digital circuits because of the capacitance between each row.

Here’s how the inside of a breadboard looks (from Wikipedia):

[http://en.wikipedia.org/wiki/File:Insidebreadboard\\_\(5\).jpg](http://en.wikipedia.org/wiki/File:Insidebreadboard_(5).jpg)

So it’s not literally a strip of metal.

-  evthepenguin | about 2 years ago 1

Thankyou! This tutorial is very helpful!

-  [willydlw](#) | about 2 years ago 1

Loved the picture of the back of the breadboard. That makes using one easy to remember now.

-  [icyfyer](#) | about 2 years ago 1

You didn't address number 5, "not for human consumption".

-  [M-Short](#) | about a year ago 2

Sorry, I figured that one was fairly self-explanatory

-  [a.dna.n5535](#) | about 2 years ago 1

Thanks! Nice tutorial.

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