

# BB300, BB400, BB400T

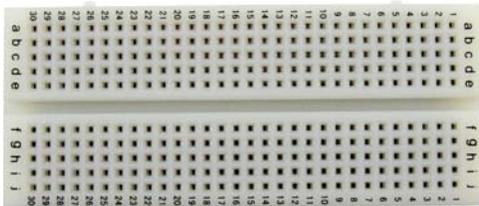
## – Plug-in Solderless BreadBoards



300 and 400 tie point solderless “plug-in” breadboards provide a quick way to build and test circuits for experimentation or when learning electronics.

Completed projects can be moved to the SB300 and SB400 Solderable PC BreadBoards to make them permanent.

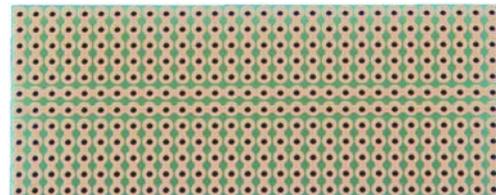
### BB300 Plugin BreadBoard



Move your project to SB300



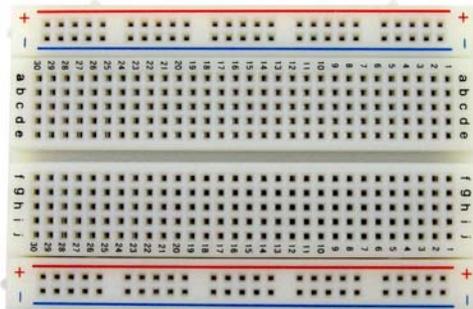
### SB300 Solderable PC BreadBoard



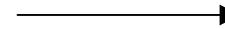
**BB300** – 300 tie point Solderless BreadBoard  
white ABS plastic with black legend  
1 IC-Circuit Area, 300 tie-points  
Size: 3.3 x 1.4 x 0.3in (84 x 35.5 x 8.5mm)

**SB300** – 300 tie point  
Solderable PC BreadBoard

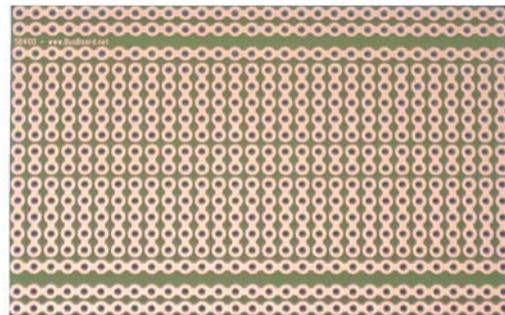
### BB400 Plugin BreadBoard



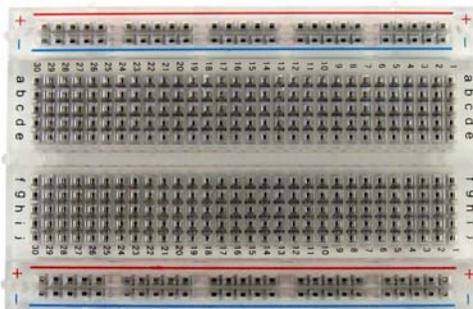
Move your project to SB400



### SB400 Solderable PC BreadBoard



### BB400T Transparent Plugin BreadBoard



The BB400T transparent breadboard is great for beginners because they can see the internal circuit connections.



**BB400 and BB400T** – 400 tie point BreadBoard,  
with two power rails  
ABS plastic with color legend, white or transparent  
1 IC-Circuit Area, 300 tie-points plus 2 Distribution strips, 100 tie-points  
Size: 3.3 x 2.1 x 0.3in (84 x 54.3 x 8.5mm)

**SB400** – 400 tie point  
Solderable PC BreadBoard

## Solderless BreadBoard Specifications

**BB300 Body Material:** White ABS Plastic with Black Printed Legend  
**BB400/BB830 Body Material:** White ABS Plastic with Color Printed Legend  
**BB400T/BB830T Body Material:** Transparent ABS Plastic with Color Printed Legend

**Hole Pitch/Style:** 0.1" (2.54 mm), Square Wire Holes

**ABS Heat Distortion Temperature:** 84° C. (183° F.)

**Spring Clip Contact:** Phosphor Bronze with Plated Nickel Finish  
**Contact Life:** 50,000 insertions  
**Rating:** 36 Volts, 2 Amps

**Insertion Wire Size:** 21 to 26 AWG  
0.016 to 0.028 inches diameter (0.4 to 0.7mm diameter)

**Backing:** Peelable adhesive tape for attaching to a surface.  
Metal back plate provided with 830 tie point breadboards.

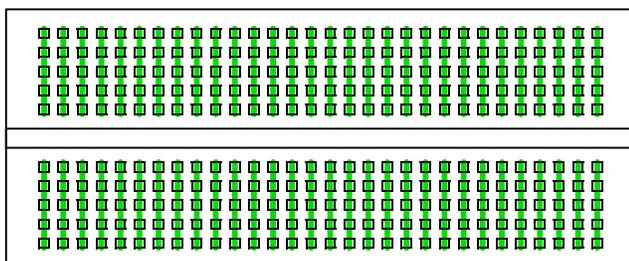
**Metal Back Plate Thickness:** 0.031 inches (0.8mm)

All BPS BreadBoards are Lead-Free and *RoHS Compliant*.



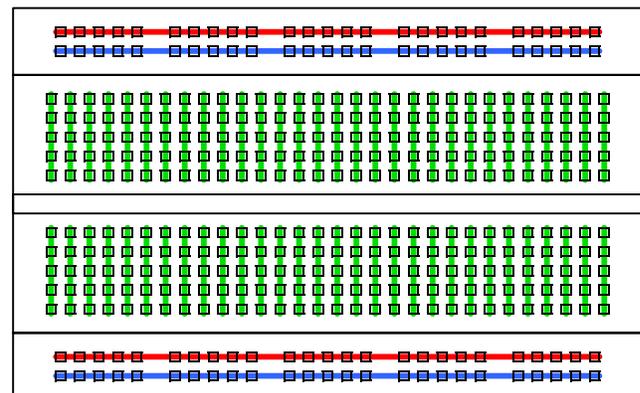
## Internal Connections

### BB300 BreadBoard



The BB300 breadboard tie-points are connected in 60 vertical columns (the green lines) with 5 connected holes in each. This is the circuit area. When an integrated circuit is plugged into the breadboard, each I.C. pin has a column. There are no horizontal running connections on the BB300.

### BB400 BreadBoard



The BB400 and BB400T breadboards have 60 vertical columns in the circuit area (the green lines) plus 4 “rails” or distribution strips for power and ground running horizontally (the red and blue lines). A distribution strip can be used to carry a signal if it is not needed for power or ground.

## **Solderless BreadBoard FAQ**

### **Q: What circuit frequencies can I use with a plug-in solderless breadboard?**

A: Due to large stray capacitance (from 2-25pF per contact point), the inductance of connections, and a relatively high and not very reproducible contact resistance, solderless breadboards are limited to operate at relatively low frequencies, usually less than 10 MHz, depending on the nature of the circuit. The relatively high contact resistance can also be a problem for some DC and very low frequency circuits.

Source <http://en.wikipedia.org/wiki/Breadboard>

Higher frequency operation may be possible in some cases, depending upon the circuit requirements.

Note: Solderable PC BreadBoards, such as the BPS BR1, SB300, and SB400 will provide lower stray capacitance and lower connection resistance which may allow higher frequency operation for some circuits.

For circuits sensitive to small changes in values, component adjustments may be needed when the circuit is moved from a plug-in breadboard to a Solderable PC BreadBoard, due to these small differences.

### **Q: Can I plug DIL or SIL connector headers into the breadboard?**

A: Yes. The square pin of a standard 0.1" spacing header is typically 0.025 inches wide. This is within the 0.016 to 0.028 inch wire insertion size range recommended for the breadboard.

## **Solderless BreadBoard NSFAQ**

### **Q: Who invented the solderless breadboard?**

A: US Patent #203938 was awarded to Ronald J. Portugal of EI Instruments Inc. in 1971.

### **Q: Why is phosphorus added to the bronze used in the contacts?**

A: Phosphor bronze is an alloy of copper with 3.5 to 10% of tin and a significant phosphorus content of up to 1%. The phosphorus is added as deoxidizing agent during melting.

These alloys are notable for their toughness, strength, low coefficient of friction, and fine grain. The phosphorus also improves the fluidity of the molten metal and thereby improves the castability, and improves mechanical properties by cleaning up the grain boundaries.

Source [http://en.wikipedia.org/wiki/Phosphor\\_bronze](http://en.wikipedia.org/wiki/Phosphor_bronze)