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Web Site: www.parallax.com
Forums: forums.parallax.com
Sales: sales@parallax.com
Technical: support@parallax.com

Office: (916) 624-8333
Fax: (916) 624-8003
Sales: (888) 512-1024
Tech Support: (888) 997-8267

EDU Circuit Overlay Board

This handy PCB duplicates your Parallax BASIC Stamp or Propeller educational board's prototyping area in a solder-friendly thru-hole form factor. Permanently solder together application circuits that can be plugged into the power and I/O pin headers on your board, and quickly swapped out as needed.

Note: The first batch of these boards was made with a gold-tone finish. Subsequent batches were made with a silver-tone, lead-free HASL finish for easier hand soldering.
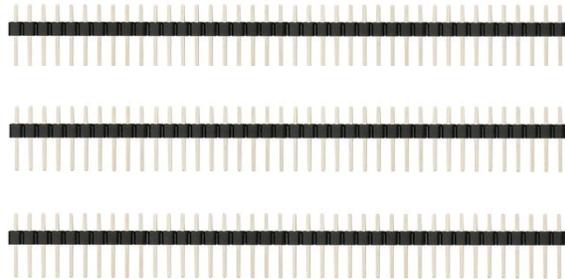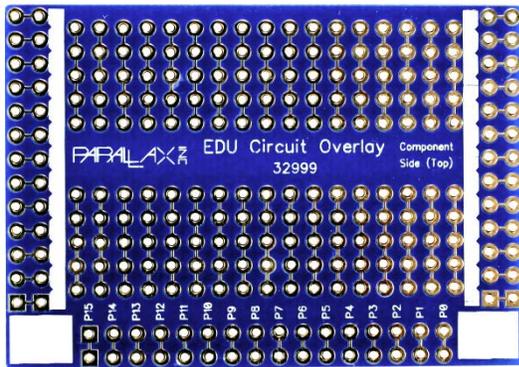
Features

- Layout matches the breadboard activities in Parallax tutorials so students can follow the same parts placement
- Silkscreen labels for marking power rails and initials on your board
- Three 40-pin headers included for power and I/O headers, with some left over for making extra 3-pin ports in the prototyping area
- Dimensions: 2.2 x 1.5 in (5.6 x 3.8 cm)

Application Ideas

- Soldering skills for STEM activities
- Firmly attach robot navigation circuits
- Pre-build circuits for students to use in troubleshooting their programs
- Classroom cost savings – several students can build their own circuits yet share a robot
- Quick-change, compact circuits for traveling demos or applications

Compatible Parallax Boards

- Propeller Activity Board (#32910)
- Propeller Board of Education (#32900)
- BASIC Stamp Board of Education (Serial #28150, or USB #28850)
- BASIC Stamp HomeWork Board (Serial #555-28158, or USB #555-28188

Additional Items Needed

- Compatible Parallax EDU board
- Soldering supplies (soldering iron, solder, flux, eye protection)
- Colored permanent markers - optional
- Multi-meter – recommended but not required

## Assembly Instructions

Step 1: Trim the 40-pin Headers to Length

- For all boards, snap off a 16-pin segment for the I/O pin header.

- Snap off 13-pin segments for the connections along the top and bottom of the prototyping area.

Step 2: Solder the Headers In Place

- Insert the shorter pins of each header into the outlined sockets from the bottom side of the board. (The correct sockets are also labeled with the word "Headers" and arrows.)
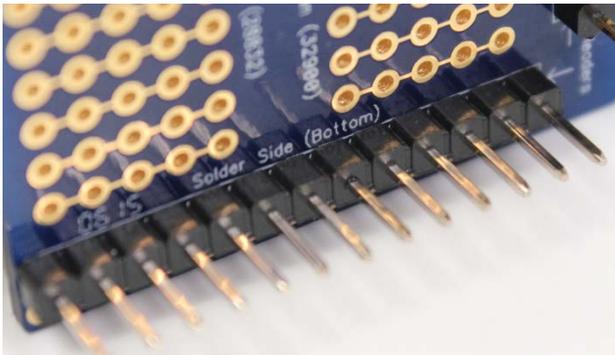
- Solder the headers in place from the top side of the board. NOTE: For BASIC Stamp boards, you will only need to solder in the 13-pin header that plugs into the power sockets along the top of the prototyping area. There are no sockets below the prototyping area on BASIC Stamp boards.
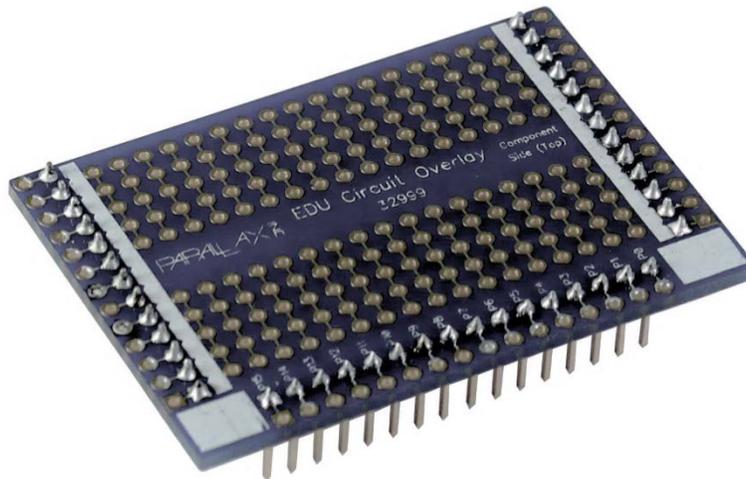
TIP: An easy way to do this is to insert the two 13-pin segments. longer-pin down, into a larger breadboard, then place the board bottom-side-down onto the shorter pins. This holds the headers in correct alignment. (the 16-pin segment won't line up with these and must be soldered separately.)

Marking the Power Rails

The EDU Circuit Overlay Board has white strips along the two shorter headers. This allows you to mark the different power connections that will be available when you plug the Circuit Overlay into your development board. Suggested color-coded markings are shown below.
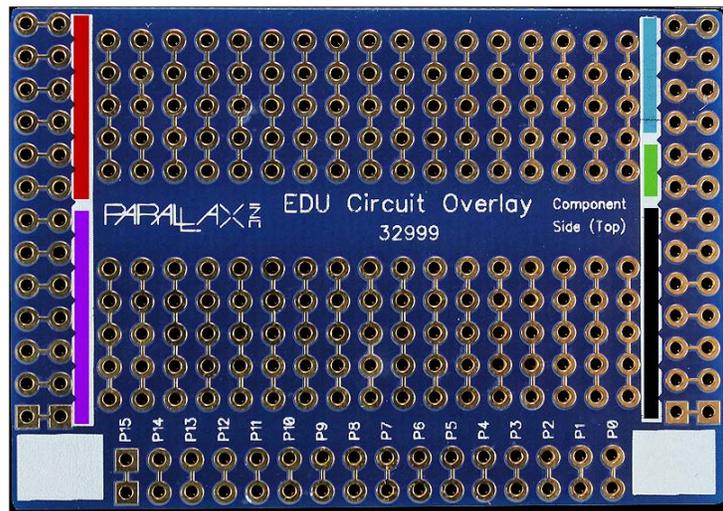
BASIC Stamp Board of Education and HomeWork Board

- Red = 5 V
- Yellow = Vin
- Black = 0 V (ground)
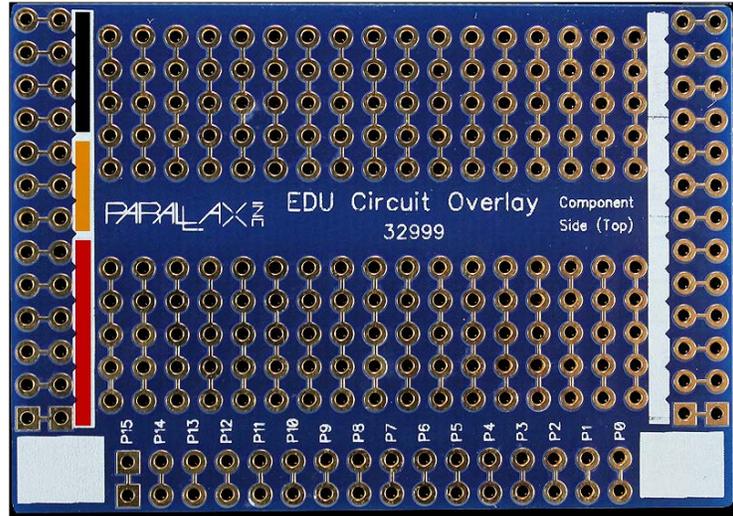
Propeller Activity Board or Propeller Board of Education

- Purple = 3.3 V
- Red = 5 V
- Black = Ground
- Green = D/A converter
- Blue = A/D Converter

Add your Application Circuit

Now you are ready to solder your application circuit to your board. Tips:

- The holes in the prototyping area match the sockets in the breadboard: 17 rows, with two 5-hole groups in each row separated by a trench.
- Each header pin connects to just one hole adjacent to it, along the outer edge of the board.
- Mark the power rails for the development board you will be using, so you can accurately solder your circuits to the correct power, ground, and A/D or D/A connections.
- Build your circuit on your development board's breadboard first.
- Test your breadboard circuit thoroughly to make sure it works as expected.
- Move the components over one at a time, carefully matching position from the breadboard to the thru-hole board.
- Slightly spread the leads on each component to provide a little bit of tension when inserting it into the thru-holes. This will help keep the component in place for soldering.
- Insert the components from the top, and solder them in place from underneath.
- Use just enough solder to attach the component to its thru-hole. Take care that extra solder does not form connections between rows, which could create a short circuit.
- Use a multi-meter to check the electrical continuity of the circuits you built.
- Plug the completed Circuit Overlay Board into your development board, then run your application code as usual.   (Note: if you put 13-pin headers on both sides of your Circuit Overlay board, and use it with a BASIC Stamp development board, the 13-pin row below the prototyping area won't plug into anything.)

Here is an example – the infrared navigation circuit for the Boe-Bot Robot.