

out of the **B** **X**

μPAD Assembly Guide

Last Revised 4/29/2019

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Parts List



Item Number	QTY	Description
1	1	μPAD 2.X
2	1	Memory Base 2.X
3	1 assembly	Backpack panel <ul style="list-style-type: none"> • 1 Switch & LED Backpack • 1 Analog Backpack • 1 Robotics Backpack
4	1	8x DIP switch
5	1	6-pin screw terminal
6	1	Speaker
7	1	CDS cell sensor
8	1	Right angle header
9	4	#2 7mm spacer
10	4	2-56 5/8" standoffs
11	1	DC Gear Motor
12	1	Speaker Spacer Bracket
13	4	M2 nuts (speaker assembly)
14	1 assembly	74HC573 and 74HC574 ICs in anti-static foam
15	4	2-56 x 1/2" screws
16	4	M2 x10mm screws (speaker assembly)
17	1	Red motor wire
18	1	Black motor wire
19	1	Shunt jumper
20	1	Power supply sticker
21	4	40-pin breakaway headers
22	4	8-pin female headers
23	1	USB A to B cable
24	1	5V wall adapter

Soldering Tips

Out of hands soldering a first joint?

Often when soldering the first point of a component you run out of hands. One is needed to hold the iron, and the other is used to hold the component/board. That leaves no hand to hold the solder to bring to the solder joint.

Solution:

Solder when bent holds its shape. Use this to your advantage. If the solder is kept in place all you need to do is bring the assembly in your hands, including the hot iron to the solder.

If you are working with just a piece of solder make what looks like a “solder swan” (shown below).



This works best with thicker solder, but it should work for thinner varieties as well. Simply wrap solder around 2 fingers to form the base and bend the remaining neck into an “S” shape. The S shape keeps the weight of the neck over the coil (stability), while giving room to work. With a spool do the same except the spool is the coil.

This technique is great for tacking down components when a vise is not available.

Assembly Procedure

Step 1: Break down 40-pin headers

Header Number	Header Size Created	Quantity of Created Header
1	8-pin	5
2	8-pin	5
3	8-pin	3
3	9-pin	1
3	2-pin	2
4	5-pin	2

Step 2: Break apart backpack boards

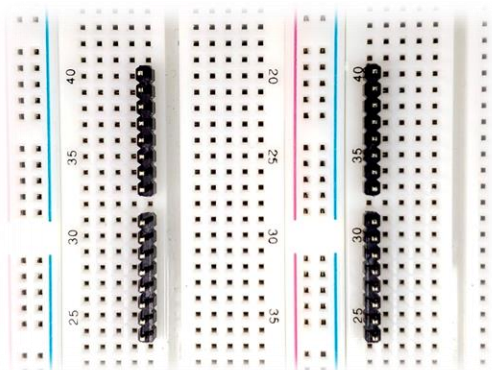
Simply snap the boards apart on their score lines.

Step 3: Analog Backpack 8-pin headers

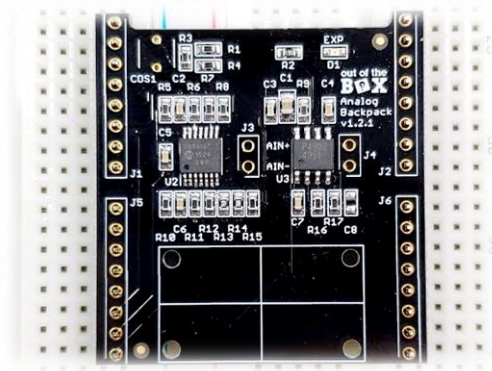
Important:

The goal here is to use the Analog Backpack headers to form the registration for all the backpack headers across the kit.

If at your disposal use a breadboard to align the 8-pin headers that go into the Analog Backpack. This will ensure the headers are all aligned well to one another. The long end of the headers will be inserted into the breadboard.

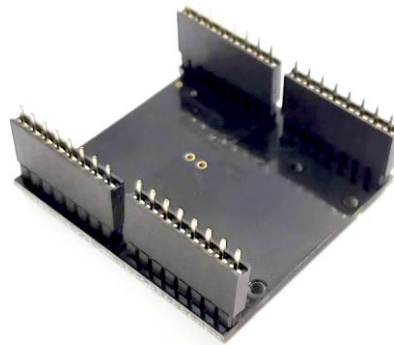


Place the Analog Backpack on the headers as shown and solder.

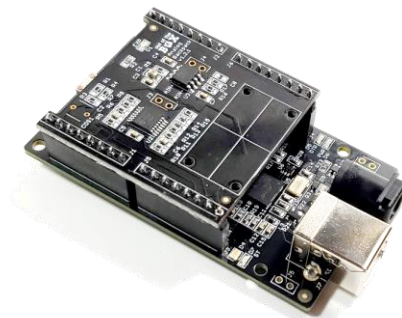


Step 4: Solder Female Headers to μ PAD

Place the female headers onto the backpack headers of the Analog Backpack.



Place the μ PAD onto the assembly and solder. The result should look like the following:

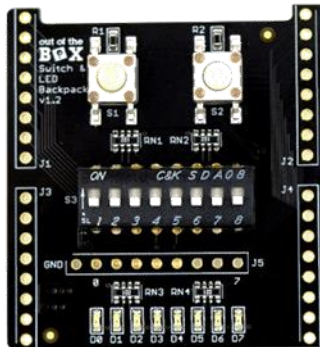


Step 5: Add Components to Backpacks

For now, it is best to hold off on adding the rest of the backpack headers since this will make adding components more difficult. Once complete, the remaining backpack header sets will be added.

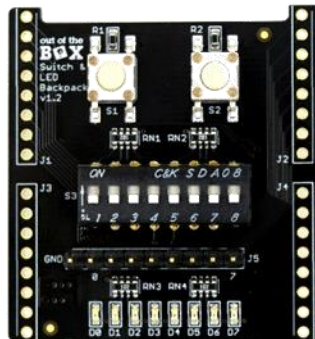
Step 5.1: DIP Switch

Solder the DIP switch (item #4) to the Switch & LED Backpack at location “S3”. Orient the switches to where the numbers labeled on the switch are nearest to the LEDs not the tactile switches.



Step 5.2: 9-Pin Header J5

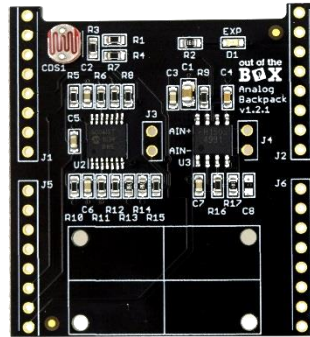
Solder the 9-pin header to the Switch & LED Backpack at location J5.



Step 5.3: CDS Cell (Analog Backpack)

Solder the CDS cell sensor (item #7) to the Analog Backpack at location CDS1. Flush cut the leads once soldered.

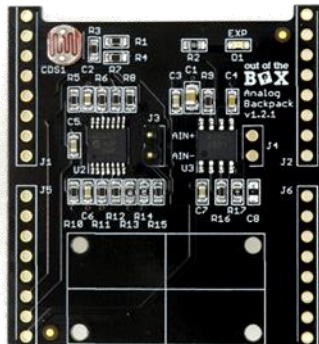
Note: The backpack connection headers will already be soldered. This is not displayed in the below image.



Step 5.4: 2-pin Header J3 (Analog Backpack)

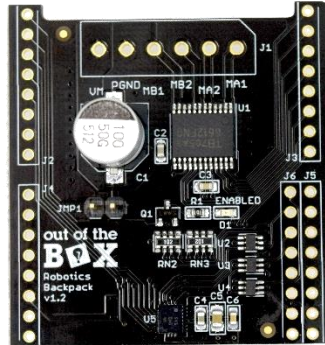
Solder a 2-pin header to the Analog Backpack at location J3.

Note: The long side of the header is pointing up in the picture below.



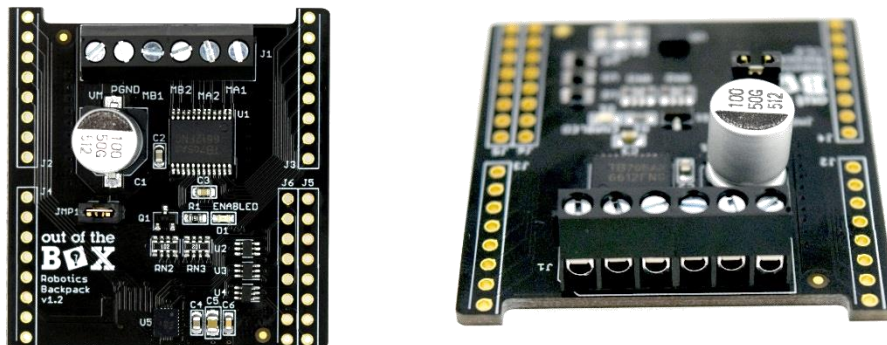
Step 5.5: 2-Pin Header (Robotics Backpack)

Solder a 2-pin header to the Robotics Backpack at location JMP1. Once finished place the shunt (item #19) onto that header.



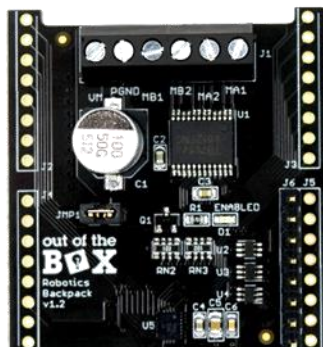
Step 5.6: 6-Pin Screw Terminal (Robotics Backpack)

Solder the 6-pin screw terminal to the Robotics Backpack at location J1.



Step 5.7: 8-pin Header (Robotics Backpack)

Solder an 8-pin header to the Robotics Backpack at location J6.



Step 6: Speaker Assembly

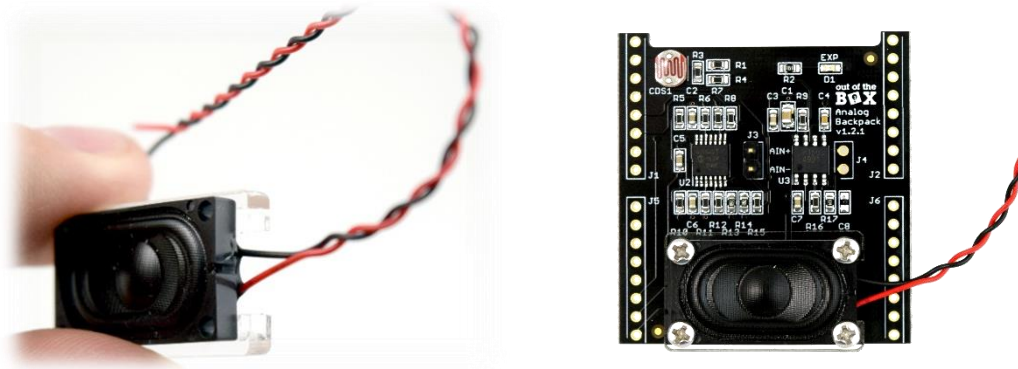
In the following sub steps, affix the speaker to the Analog Backpack using the bracket (item #12) screws (item #16) and nuts (item #13) provided.

Step 6.1: Prep Bracket

Prep the speaker bracket. Ensure the bracket holes are unobstructed. If needed use a screw to push any remaining plastic out of the mounting holes. Then peel the paper off the speaker bracket.

Step 6.2: Mechanical Assembly of Speaker

Place the speaker on the speaker bracket. The open end of the bracket mates to the wired side of the speaker. Since the speaker wire will be soldered to J4 in the next step, orient the speaker bracket assembly so that the wire is nearest J4. Attach the assembly to the Analog Backpack using the provided nuts and screws.



Step 6.3: Speaker Electrical Connection

Solder the speaker to location J4 (not polarized).

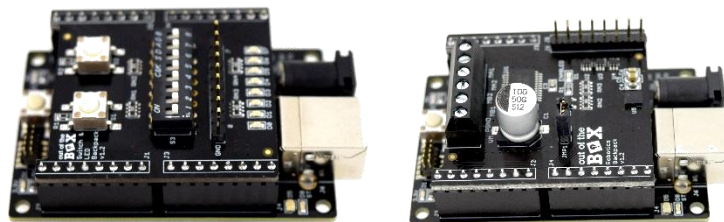
(Optional) cut and re-strip the speaker wire to a preferable length. **Do not attempt without a wire stripper possessing a 28AWG setting!**



Step 7: Solder Remaining Backpack Headers

Insert four of the 8-pin headers into the female headers previously soldered to the μ PAD. Place the Switch & LED Backpack onto the butts of these headers. Make sure that the relief of the backpack is placed nearest to the reset button on the μ PAD. Once oriented correctly solder the headers to the backpack. Repeat for the Robotics Backpack.

Note Below image features a μ PAD 1.X but the process is the same.



Step 8: Memory Base Assembly

In the following steps add the required headers to the Memory Base v2.X

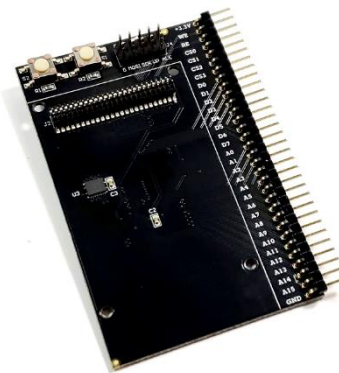
Step 8.1: Breadboard Header

Solder the right-angle headers (Item #8) to the memory Base. Once soldered break off the excess pins.



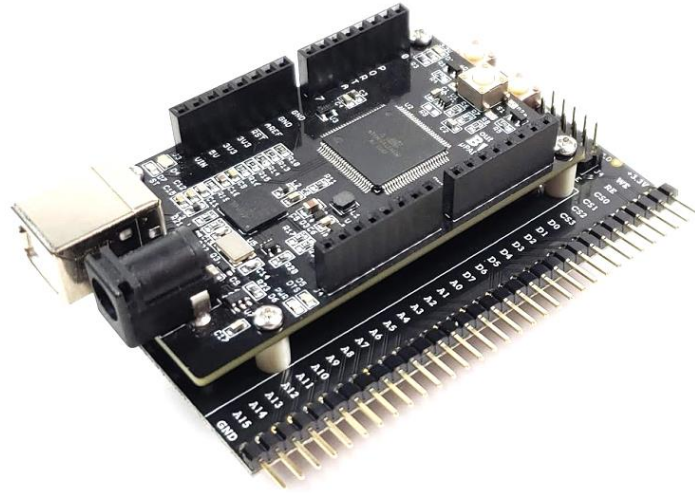
Step 8.2: Probe Headers

Solder 2x 5-pin headers to J4.



Step 9: Memory Base Attachment to μ PAD

Use spacers (item # 9), screws (item # 15), and standoffs (item # 10) to hold the memory base to the μ PAD. Take care when inserting the memory base into the μ PAD.



Step 10: Adhere Sticker to Power Supply

Place the sticker on the provided power supply to prevent using an incorrect supply. Power Supplies greater than 5V can destroy certain backpack boards that utilize the external power input.

