Carlson SuperProbe2 ABS Case Kit Assembly

First, thanks for purchasing this kit. This case kit is intended to work with our other SuperProbe2 PCB kits. You should watch Carlson's original YouTube video on the probe. This kit incorporates our battery pack kit with an ABS Hammond machined case and speaker. The typical Li-Ion prismatic cell is nominally rated at 3.6-3.7VDC and will be as high as 4.2VDC when freshly charged. ***This Case Kit requires many additional parts that are part of our SP101K2 SuperProbe2 Kit. (Including the switch, pots, power LED, PCB & parts, incandescent lamp.) You can also upgrade our SP101K1 PCB kit with the SP101K2X kit.***

The kit includes a 720-800mAh internally protected cell and a TP4056 1A micro-USB charger module with LED indicators, along with some wire & connectors & screws and plastic spacers. The TP4056 needs to be rigidly fastened into the provided holes so that the micro-USB connector is accessible on the side & dual LEDs are visible through the top. The kit also includes the speaker assembly that fits into the top panel slots. ***CAUTION: Do pay attention to battery polarity both in wiring the TP4056 and connecting the power supply through a switch to the SuperAmp. Use the photos here and on our website as an assembly reference.***

Assembly

Please note that this PCB assembly process is done in-situ and flux cleaning will be challenging after-the-fact! Use only rosin-core solder (or no-clean non-conductive flux solder) for PCB wiring! You have been warned!

Use the attached pictures to organize component locations. The amp PCB mounts using the top PCB holes (marked 4-40 tapped). The battery is fitted between the unused lower case posts with the wire to the left. (Use the optional foam tape if you want to permanently attach the battery. The 4056 charger is mounted with the included screws and plastic stand-offs. ***Use the photos to guide TP4056 mounting. DO NOT wedge the micro-USB jack into the side opening. Place spacers over the holes, then fit the TP4056 on top of the spacers, then fit the 0-80 screws from the outside, then fit the washers & nuts. Tighten gently.*** The POTs, power switch and power LED are fitted to the control panel. If needed, carefully bend POT pins to face to the back of the POT.

Recommended Assembly Sequence

1. Mount the assembled SuperAmp PCB to the case bottom using the included #4-40 BHC screws (and washers if included) using the mounting bosses marked *4-40 tapped*.
2. Mount the battery below the PCB and between the screw posts with the wire to the right and toward the bottom or top. Use sticky pad if desired. Do not connect the battery until all assembly is complete.
3. Prepare the controls wiring. Bend POT pins to the back for clearance. Using 2-1/4" pieces of #22 wire (10 total), trim ~1/8" from one end of each wire. Lap solder the wires to POT terminals (3 each) and power switch (2) and power LED (2). (Make note of the LED polarity for PCB connection.) Place ~1/4" of appropriate heat-shrink tubing over each terminal and hot-air shrink the tubing.
4. Assemble power switch, 2K & 5K POTs & LED to the control panel. The LED is press-fit into the mounting hole. The *unused switch terminal* is oriented to the top. The POT terminals are oriented to the left.
5. Prepare the 4-wire probe jack by removing the 4 color-coded #24 wires from the PVC sheathing. Trim ~1/16" from the end of each wire. Following the pin numbering and color coding, lap solder each wire to the corresponding jack terminal. Use a fine tip and minimal heat to do the job. Add HST to terminals as noted before. (Note that the jack terminals are marked on both the plastic base and the metal terminals.)
6. Mount 4-wire jack into case top using the included nut.

7. Prepare the RCA audio output jack. Using 2 pieces of ~4" #22 wire, trim as before and solder the wires to the RCA center and ground ring. Insulate the center wire with HS tubing.
8. Mount the RCA jack into the case top using the included nut.
9. Mount the 4056 charger PCB to the case top using included hardware. ***Use the photos to guide TP4056 mounting. DO NOT wedge the micro-USB jack into the side opening. Place spacers over the holes, then fit the TP4056 on top of the spacers, then fit the 0-80 screws from the outside, then fit the washers & nuts. Tighten gently.*** Have patience and work over a tray so you don't lose parts.
10. Position speaker in top slots with the wires to the right and solder speaker wires to speaker thru-holes on Amp PCB. (No polarity order is necessary.)
11. With the control panel placed in the bottom slots, orient all control panel wires (*POTS, LED & SW)* over the top of the battery and in proximity to their respective thru-hole terminals. Trim excess wire and expose ~3/32' wire on each end. Carefully fit each wire into the respective thru-hole, noting that the ***top pin*** on each POT is terminal #3. The positive (anode) of the LED is terminal #1. Before soldering, make sure that there are ***NO*** stray wire strands. With a fine tip iron, solder each wire in place.
12. With the upper half of the case positioned immediately to the right of the bottom half and the TP4056 to the ***right*** (see photos), Route the 2 RCA wires over the PCB and approximately near the AO thru-holes. Trim and expose as before, and fit wires into the AO terminals with the RCA center wire in pin #1. Solder as before.
13. Orient the 4 color-coded probe jack wires over the PCB thru-hole pins. Trim wires as before and fit to pins following the wiring table. ***Triple check your wiring order, color,*** then solder in place.
14. Battery connection.
    a. Fit the male battery connector leads into the 4056 solder pad holes as shown in photo but don't solder yet. ***Observe polarity.*** Several connections to terminals need to be made and it is unlikely all wires will fit into the existing holes. Therefore, surface soldering to the pads may be necessary.
    b. Cut two (2) ~5" #22 wires (preferably of different colors) and trim ~1/8" from one end of each. Fit the negative wire end into the TP4056 negative terminal along-side the male battery wire and solder both wires in place.
    c. On some TP4056 PCBs the positive thru-hole is too small for two wires. Solder the positive male battery wire in place and carefully solder the positive supply wire to the pad surface.
    d. Route the two power supply wires over the top of the SuperAmp PCB and in proximity of the ***Power Terminals*** in the upper-right of the SuperAmp PCB. Trim as before and fit the power wires into the respective G1/G2 & B1/B2 thru-holes. (G1/G2 are wired together as are B1/B2.)

All connections should now be complete. This is a good time to review all connections for good solder joints and agreement with the Amp schematic. Look for bridging solder joints, stray wire strands, out-of-order wires etc.

Testing

Do the following ***before*** connecting the battery.

1. Using an ohm meter, check the resistance between the PCB (B1/B2) and ground(G1/G2) with the ***power SW ON***. It should be in the Kohm range.
2. Check "Probe In" (pin #2) to ground. It should be ~4.7K.
3. Check "Probe Supply" (pin #3) to ground. It should range from 0-2K based on Probe Gain POT position.
4. Check the resistance between PCB "B1/B2" and 4056 (Batt+) terminal. It should be 0-ohms.
5. Check the resistance between SW pin #2 and 4056 (Batt+) terminal. It should be 0-ohms with the switch "ON" and open-circuit with the switch off.
6. Check and verify the pos/neg polarity wiring of the battery connectors.

7. Finally check the resistance from each speaker terminal to ground to verify neither is grounded. Resistance should be in the K-ohm range or more.
8. Correct any errors or discrepancies.
9. Connect the battery and switch the power ON. The LED should light. Because the probe is not connected and the preamp transistor has no input signal the speaker should be quiet. You can inject noise or a signal at the PCB "Probe In" terminal to further test the amplifier.
10. Measure the battery voltage at the 4056 (Batt+) & (Batt-) terminals. You should get 3.2-4.2V depending on the battery charge state.
11. Plug in the charger cable and power the charger to verify that the 4046 charges the battery. ***Red*** is charging and ***Blue*** is charged.

The SuperProbe2 Amplifier is now complete. Route wires around the screw bosses (4) and close the clamshell case. If it won't close tightly, you have wires interfering! Fasten the 2 case sides with the provided screws. You are now ready to assemble the SuperProbe2 Probe unit. If your probe is completed you can now plug it in and test the complete SuperProbe2. I would recommend a final verification that you have the tip/ring1/ring2/common wiring in the probe matching the jack (J1) in the amplifier. Once connected you should get hissing, popping and myriad other noises from the speaker depending on the POT settings in the Amp and Probe.

Cable & Jack Wiring			
Schematic Pins	Pin Name	Cable Coloring	Jack Pin
1	sleeve	black	1(M)
2	tip	red	2
3	ring 1 (outer)	white	3
4	ring 2 (inner)	yellow or green	4

Feedback

If you find errors, omissions, or if you have suggestions on the instructions, kit, packaging or anything else, I would be happy to receive feedback.

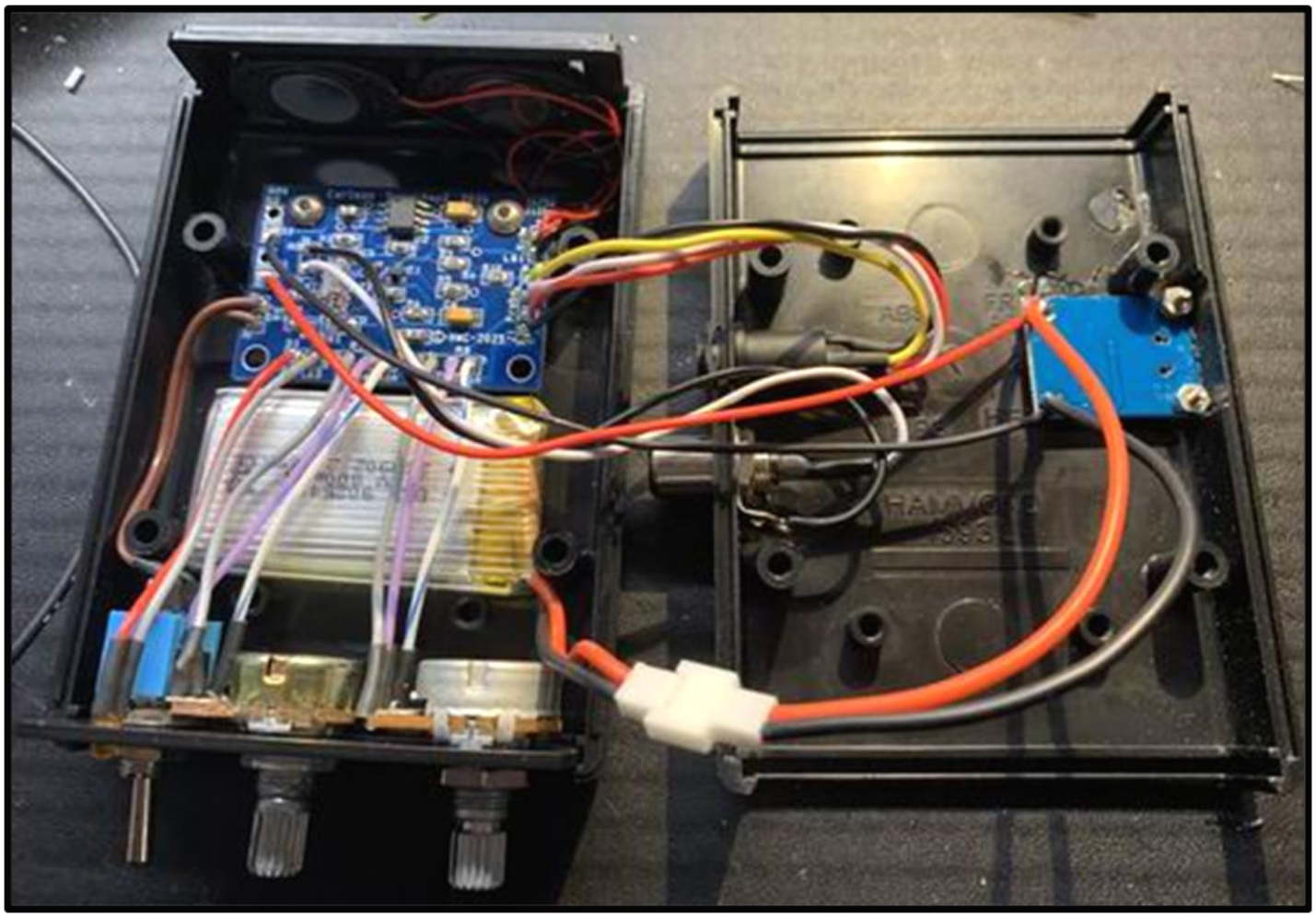
The easiest way to provide feedback would be by email to:

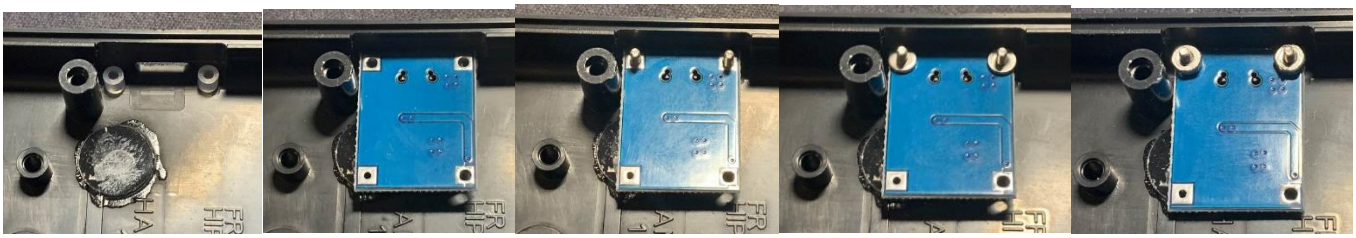
Kevin
hcsales@hwcz.com or
ppsales@hwcz.com

	SP2-CaseKit Parts List Included		
1	**USBC1**	**1**	**TP4056 micro Li-Ion Charger**
2	**BT1**	**1**	**800maH Li-Ion Protected Battery**
3	**J1A**	**1**	**Male battery cable**
3F	**Spare**	**1**	**Female battery cable**
4	**Wire**	**3ft 22awg**	**Misc hookup**
5	**HST**	**12"**	**Misc shrink tube**
6	**Screws**	**2 – #0-80 w/nut**	**TP4056 fasteners**
7	**Spacers**	**2 – plastic**	**As needed for TP4056**
8	**Speaker**	**2 -1W 8ohm**	**Mounted and wired in parallel**
9	**Case**	**1593LBK**	**Machined Case**
10	**Screws**	**4 – 1" FH**	**Case screws**
11	**Screws**	**2 - #4-40**	**PCB mounting**
12	**Pad**	**foam sticky**	**Optional battery hold-down**
13	**Cable**	**USB**	**USB charger cable 1ft**
14	**4-wire**	**4" #24**	**jack wiring color coded**

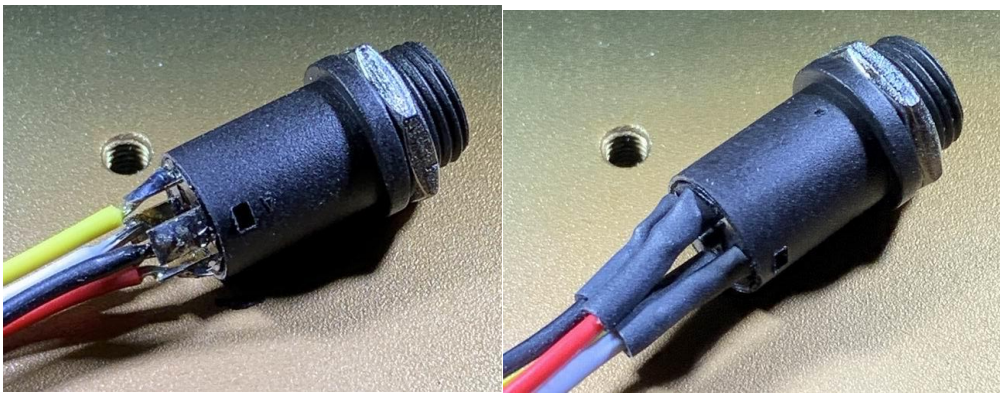
References

https://www.youtube.com/watch?v=uVkJqqZroN0&t=2583s
https://www.instructables.com/Carlsons-Super-Probe/
https://www.hollywoodcontrols.com/phpSP/MCSP_CaseKit.php





4056 Charger Module Install Sequence



Probe 4-Wire Jack Wiring

Control Panel Pigtail Wiring