

USB battery pack keep-alive load

...keeps your battery pack switched on!

USB power packs are readily available and seem just perfect for powering your low-power USB devices. Unfortunately, many such packs will switch off if the current being drawn is too low. Our electronic load allows you to adjust the current draw to just beyond the point where the load keeps switched on. It's an efficient and simple way of using your power pack! Building the Keep-alive Load is easy and fun. It will take about 30 minutes to build and is suitable for a beginner.





Packing List

It's a good idea to check that you have all the parts before you get started:



Item	PCB Designator	Comments
РСВ		
LED	D2	
Trimmer Pot	R1	Blue
Resistor (2) 47Ω	R2, R3	yellow-purple-black-gold-brown
Resistor (2) $33K\Omega$	R4, R5	orange-orange-black-red-brown
Transistor (2)	Q1, Q2	
USB A female	J1	shorter connector
USB A male	J2	longer connector
Heatshrink sleeving - clear		looks like a rectangle of clear plastic

If anything is missing, just get in touch for help. support@sotabeams.co.uk

Tools

- 1. Soldering iron with a fine tip (e.g. 1.2mm)
- 2. Fine solder (e.g. 0.7mm).
- 3. Sidercutters / wire cutters
- 4. Craft knife
- 5. Pot trimmer / small screwdriver



Building tips

Use a soldering iron with a fine tip (e.g. 1.2mm) and a fine solder (e.g. 0.7mm). All the components are installed on the top side of the board labelled "SOTAbeams". Use the list above to identify the components. Only solder a component when you are sure that you have inserted the correct one.

Assembly

- 1. Install and solder R2, R3 (47 $\Omega,$ yellow-purple-black-gold-brown)
- 2. Install and solder R4, R5 (33k $\Omega,$ orange-orange-black-red-brown)



3. Trim the legs of the resistors.

4. Install and solder J2 – USB plug (the longer connector) – make sure that it is straight before soldering (tack-solder and adjust if necessary).



5. Install and solder R1 (blue pot), Trim the legs using sidecutters.



6. Install and solder J1 – USB socket (the shorter connector) – make sure that it is straight before soldering (tack-solder and adjust if necessary)

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7.Insert D2 (LED) into the PCB with the shorter leg in the square pad. Make sure that the LED is flush to the board before soldering (tack-solder and adjust if necessary). Trim the legs of the diode.



8. Install and solder transistors Q1 and Q2 – note these must be installed the correct way round as indicated on the pcb. Note the back casing of the transistor is not flush with the PCB. Trim the legs of the transistors.



Testing

Turn R1 (pot) fully anticlockwise. Plug the load (J2) into a USB power pack socket. The LED should light. Plug your intended target device (e.g. WSPRlite) into the USB socket (J1). If the USB power pack powers down after a few minutes (LED on Keep-alive load goes off), turn R1 slightly clockwise to increase the current being drawn. Note that some USB power packs take a few minutes to power down. Repeat the previous step until the battery pack remains on reliably with the keep-alive load and your target device connected. This will ensure that you have the minimum additional current for best battery life. The most likely problem on this board is a poor solder joint, Inspect your soldering carefully.

Encapsulation

Before putting on the heat-shrink sleeving, ensure that you remove any sharp wire ends on the underside of the board. Clip with wire cutters / sidecutters. Cut the sleeving to 5cm length and slide over the board from the J2 end. Push up and over J1 until the J2 end of the sleeving sits about 3mm



beyond the board edge (over J2). Gently heat evenly on both sides with a hot air gun or hair dryer with a low temperature setting. If you want to adjust the load again, using a sharp knife, cut a small window in the heatshrink over the pot.

