WSPRlite Power Conditioner

a Powerpole Power Conditioner for your WSPRlite

Ideal for running your WSPRlite from a battery supply or "wall-wart", the WSPRlite Power Conditioner converts any 7 - 20 Volt DC supply into a super-clean quiet 5 Volt USB supply - perfect for your WSPRlite.

We use a linear regulator to avoid the noise problems so often associated with cheap switching regulators. Rated at 200 mA and with a re-settable fuse, the Power Conditioner will keep your WSPRlite happy - and safe too. The DC input is protected against voltage spikes by a special TVS diode and is provided with additional smoothing with a low-esr input capacitor. These features have been added in case you wish to use your WSPRlite in a mobile setting. Unlike simple chargers, we also condition the data lines to avoid unwanted noise affecting your WSPRlite.

Building the Power Conditioner is easy and fun. It will take about 30 minutes to build and is suitable for a beginner.

Revison History

10-Jan-17 First issued

23-Jan-17 Added reference to polyfuse.

6-June-17 Update for pcb V2.0

12-June-17Minor improvements (customer suggestions)

POWER CONDITIONER Packing List

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

Designator	VALUE	NOTES
C1, C2	10uF	Yellow tantalum bead capacitors 10-25V
R1, R2	15k	15k Ohm resistors brown green orange
R3*	220	220 Ohm resistor red brown
D1	Transient suppression diode	Black with silver end
D2	LED	3mm
F1	Polyfuse	Yellow RX20F
J1	USB socket	
U1	5 Volt	IC voltage regulator
	Heatsink	black finned metal
J2 part	red Powerpole connector shell	
J2 part	black Powerpole connector shell	
J2 part	Powerpole connector contacts	x2 Special PCB contacts
J3*	Optional 2.1mm power connector	Not suitable for use with enclosure kit
	PCB	

*=suppied with V2.0 pcb kit only

Item	Number	Comments
ENCLOSURE KIT		
Laser cut front panel	1	
Black plastic box	1	
Nylon hex spacers	6	
Nylon screws	6	
Nylon nuts	6	
Aluminium foil (self adhesive)	1	to put in the bottom of the box

If anything is missing, just get in touch for help.

Richard@sotabeams.co.uk

POWER CONDITIONER Instructions

The POWER CONDITIONER kit is easy to make and you will end up with really useful addition to your portable station.

Step by step instructions together with photographs will make it easy to build your Power Conditioner. It will take around 30 minutes of work.

Spotted a mistake or need help?

Please let me know!

Email Richard@sotabeams.co.uk, telephone +44 (0) 7976 688359

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 except U1 and its heatsink are installed on the top side of the board labelled "SOTABEAMS".

Use the list above to identify the components.

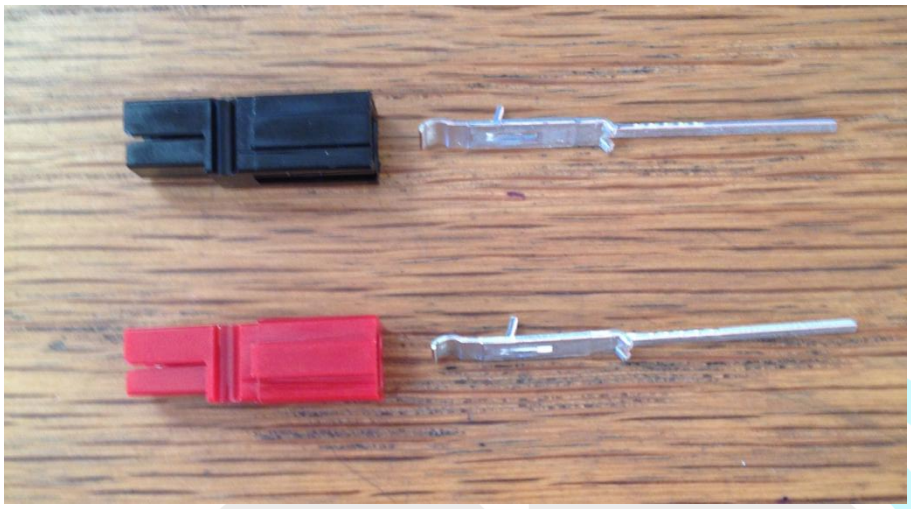
Only solder a component when you are sure that you have inserted the correct one.

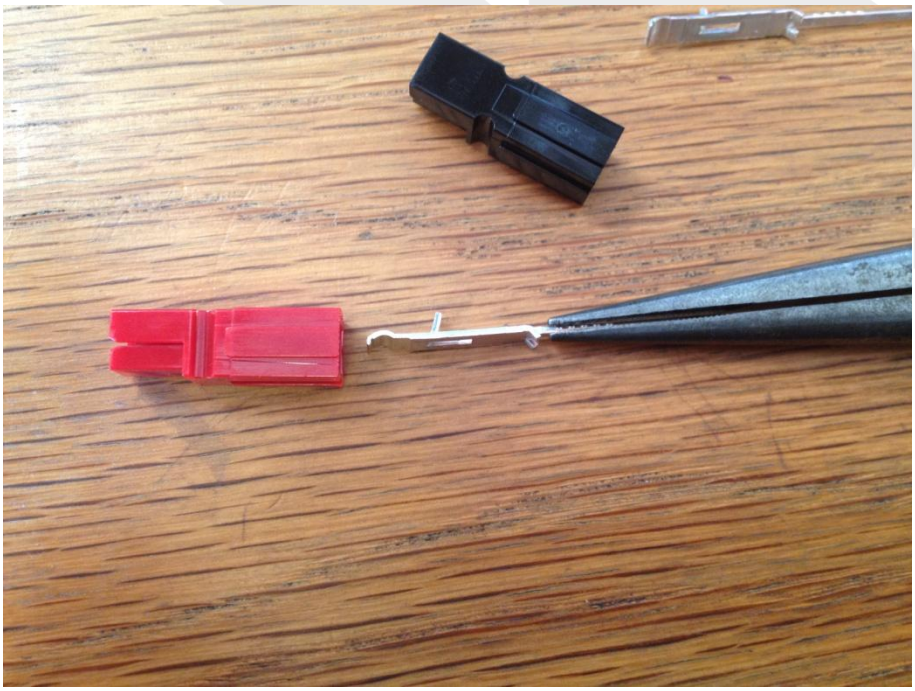
Assembly

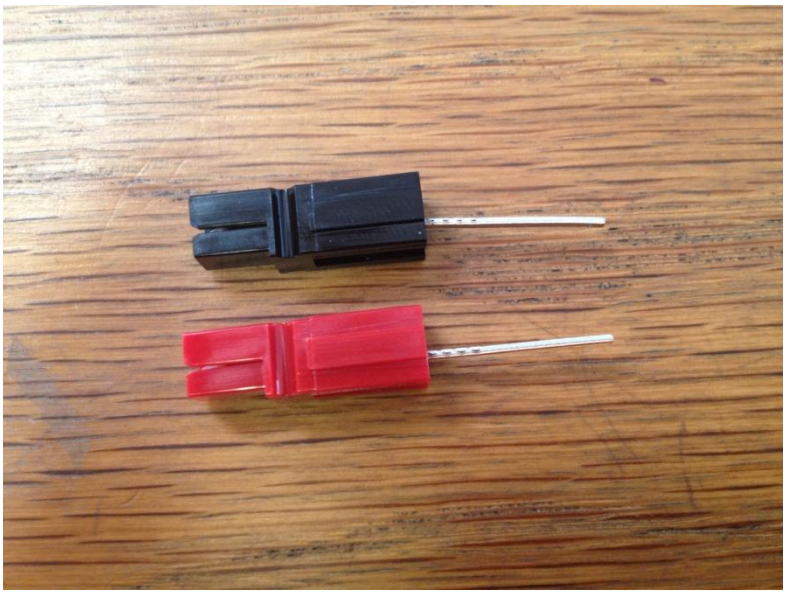
NOTE: PCB version V2.0 is supplied with two different power input connectors The black 2.1mm socket is only to be used if you are not intending to use our enclosure kit. If you are using this connector, skip instruction 1, 2 and 3. If you are using Powerpoles (recommended), start at instruction 1.

1. Slide the pins into the plug shells. This is best done with pliers. They click into place when seated correctly. Note that they only go in one way – see photo. The tongue of the metal contact slides to the front on the shell clipping over the metal slide in the shell. When correctly assembled, the post extends 20mm from the back of the shell.

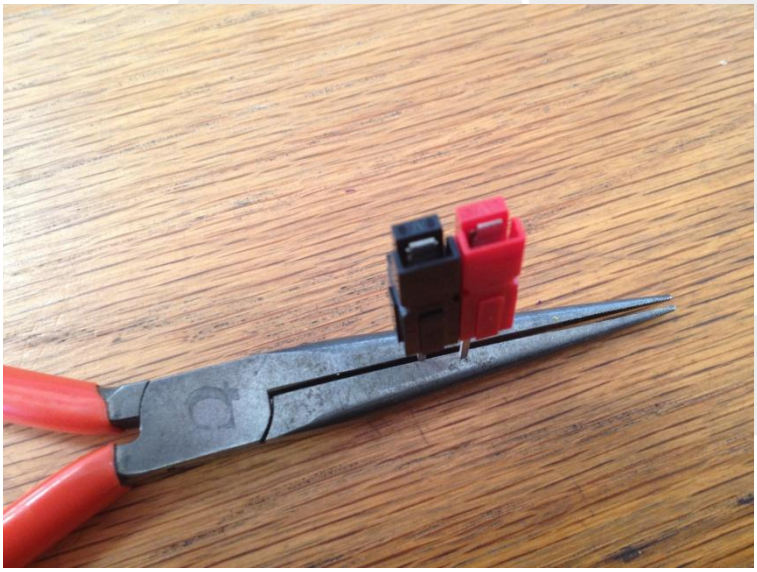
The diagram above is for the standard Powerpole contacts. The cutway shows how the contact should sit when clicked home properly







2. Pair up, the shells as shown, one black and one red. The shells will pair up in many ways so make sure that you get them right – as shown in the photograph. This is the “standard way” of using Powerpole connectors for ham radio use.



3. Install the connector on the top surface of the board with the red shell against + symbol.

4. Install R1 and R2. They can be sat slightly above the board to ease their installation.

5. PCB V2.0 only: Install R3

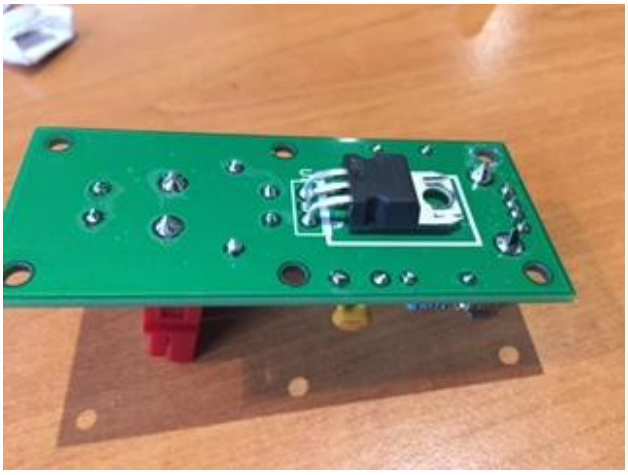
6. Install D1 with the silver band as indicated on the silk screening.

7. Install C1. The + lead goes into the square pad.

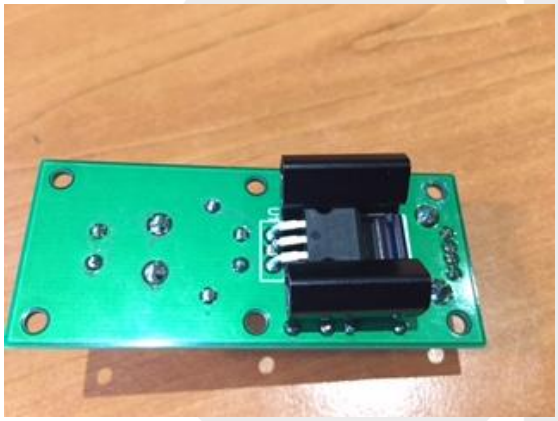
8. Install C2. The + lead goes into the square pad.

9. Install fuse F1. This can go in either way round.

10. Install U1 on the underside of the board as shown.

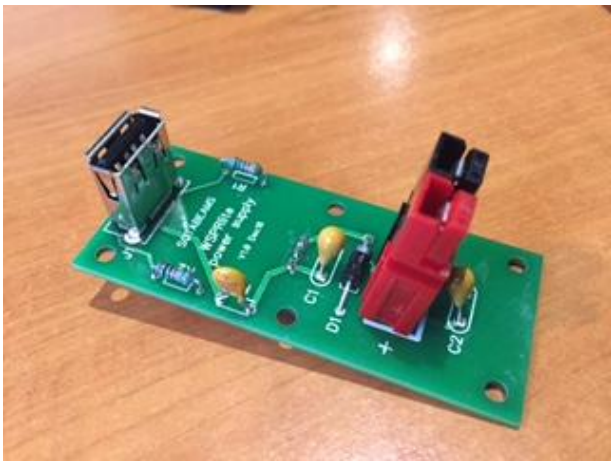


11. Slide the heat-sink onto U1. It should fit tightly. If it does not, remove it, bend the tab on the heat sink down and try again.



12. If you have not purchased the enclosure kit, install the USB connector. If you have purchased the enclosure kit, leave the installtion until after you have completed the enclose installation.

13. If you are not using the enclosure kit, install the LED, D2. The short lead of the LED goes through the square pad. If you are using our enclose kit, poke the LED through the holes but do not solder it.



PCB V1.0

Testing

This is a good time to test the PCB.

First perform a detailed visual inspection of the PCB. Check that all the connections are soldered properly and that the pins of U1 are properly soldered with no bridges.

Apply a fused/current limited 12 Volt supply to the Powerpole connector.

On the top side of the board, carefully check the voltages on the pins of U1. On the top side of the board (the one with the writing on it) the right-hand pin should have 12 Volts on it. The middle pin, 0 Volts and the left-hand pin 5 Volts (+/- 0.1 Volts).

Next check the Voltages on the holes where the USB connector will be installed – do not install it yet!

On the hole with the square pad (left-hand side) 5 Volts (+/- 0.1 Volts)

Right-hand pin 0 Volts.

Mounting Instructions

Insert the six nylon hex spacers into the PCB so that the screw thread is on the underside of the PCB.

Screw the nylon nuts onto the spacers – do not over-tighten.

Attach the PCB to the laser cut panel using the six screws – do not over-tighten.

PCB V2.0 only: Push the LED up so that it sits in the hole on the front panel, solder in position on the PCB.

Bend the mounting lugs on the USB socket inwards slightly and insert it through the slot on the front panel. Open out the lugs and carefully push it so that he lugs and pins go through the PCB. It should be a perfect fit. If it does not fit, you have probably put it in the wrong way round!

Cut the self adhesive aluminium sheet and stick it in the bottom of the box. This acts as a heat spreader for the heatsink.

Insert the Power Conditioner Mini unit so that the heatsink sits over the aluminium sheet. Screw down with the screws provided in the box.

The four black circular blanking parts are not needed.

Fault finding

The most likely problem on this board is a poor solder joint, Inspect your soldering carefully.

If you get stuck, send me an e-mail for help! Richard@sotabeams.co.uk