

Ace4U

Cable-Free 4-Port USB Hub for Raspberry Pi A+/3A+

User Manual (revision 1.00)

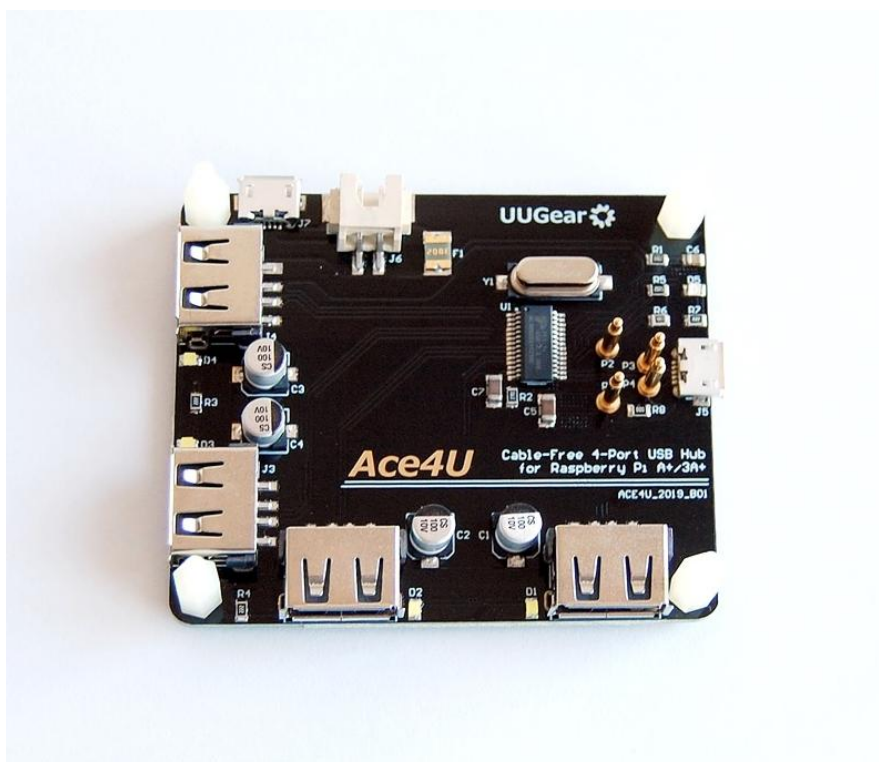


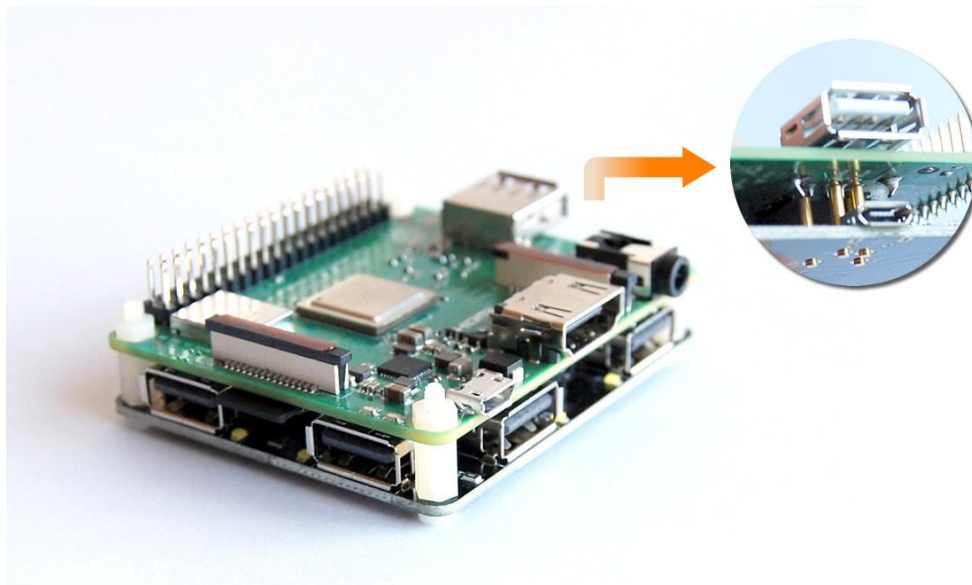
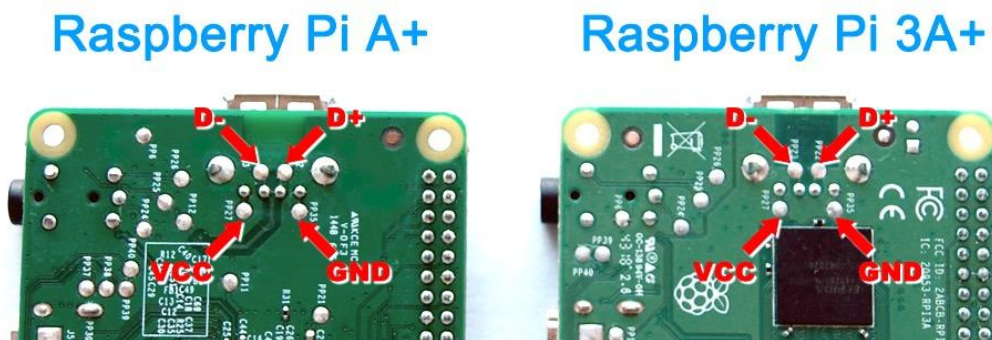
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Product Overview

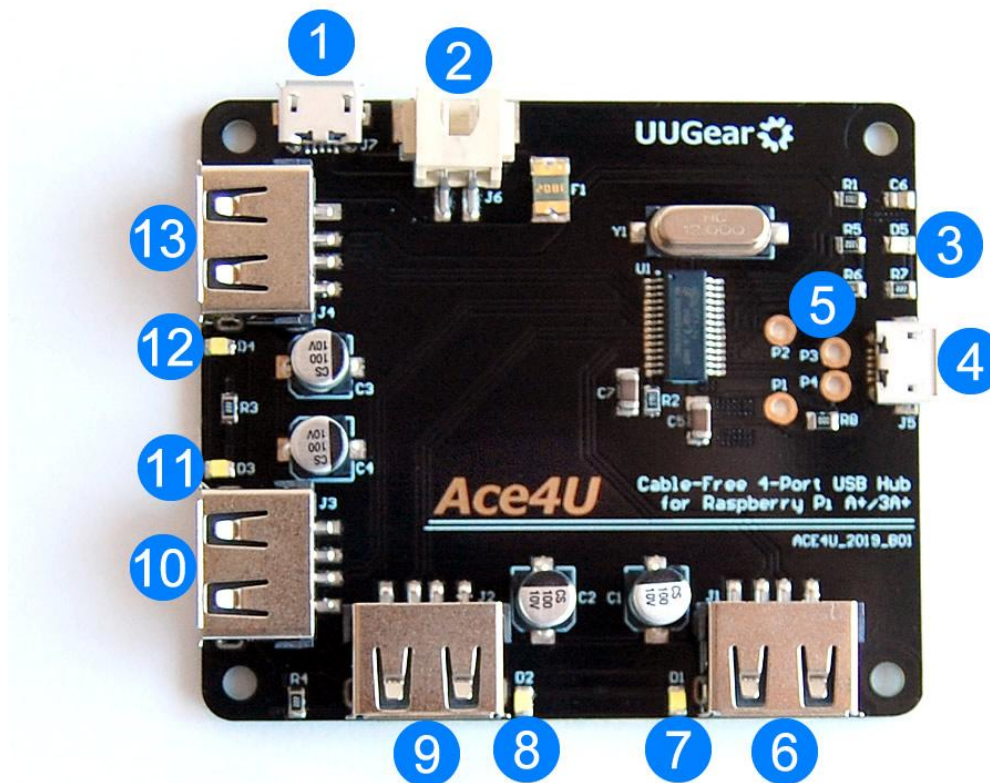
Ace4U is a 4-Port USB hub designed for Raspberry Pi model A+ and 3A+. By mounting Ace4U underneath, Raspberry Pi A+ or 3A+ can have 4 standard USB ports, which allows you to connect more USB devices. The board size of this USB hub is exactly the same with Raspberry Pi A+/3A+, and can be firmly attached under Raspberry Pi A+/3A+.

How does it work? The Raspberry Pi A+ and 3A+ has the same USB port location and the same layout of its testing pads on the back. The detachable 4 pogo pins on Ace4U board will connect the VCC, GND, USB D+ and USB D- testing pads at the bottom of of Raspberry Pi A+/3A+, so you don't need any USB cable to make it work.



Although it is designed for Raspberry Pi A+/3A+, you can still use it as a normal USB hub for other models of Raspberry Pi, or any computer that has USB port. You will need a USB – micro USB cable (not included in package) to connect this USB hub to the host USB port.

How does it look like? Please see the picture below:

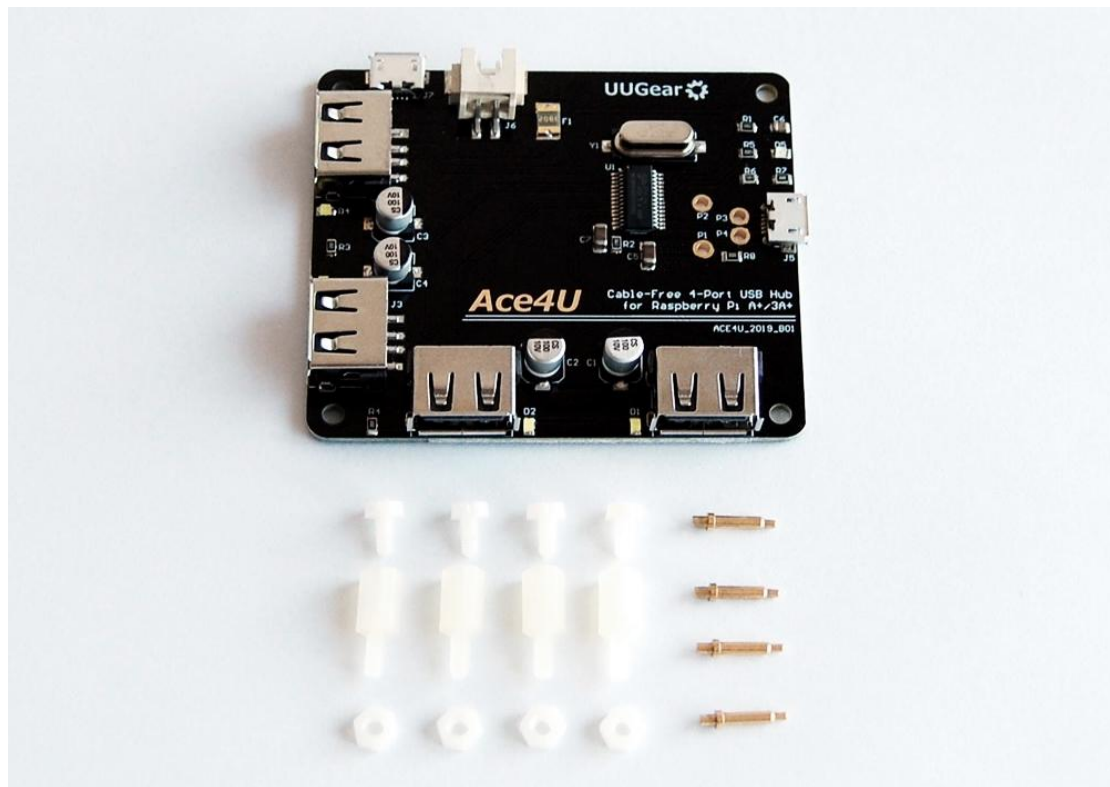


- 1) Micro USB port for external power supply
- 2) XH2.54 connector for external power supply
- 3) Orange LED as power indicator
- 4) Upstream micro USB port (USB Input)
- 5) Pogo pin holders for VCC, D-, D+ and GND
- 6) Downstream (Output) USB port 1
- 7) White LED as activity indicator for USB port 1
- 8) White LED as activity indicator for USB port 2
- 9) Downstream (Output) USB port 2
- 10) Downstream (Output) USB port 3
- 11) White LED as activity indicator for USB port 3
- 12) White LED as activity indicator for USB port 4
- 13) Downstream (Output) USB port 4

Package Content

Each package of this USB hub contains:

- Ace4U board x 1
- Plastic male-female standoff x 4
- M2.5 screw x 4
- M2.5 nut x 4
- Pogo pin x 4



Specifications

Dimension:	65mm x 56mm x 9mm
Weight	20g (net weight without any accessory)
Standards	USB Specification Revision 2.0 and 1.1 compatibility Single Transaction Translator (STT)
Data Speed	USB v1.1: 12 Mbps USB v2.0: 480 Mbps
USB Ports	Upstream: 1 (micro-USB or via pogo pins) Downstream: 4
LED Indicators	Power: 1 (orange) Port Activity: 4 (white)
Power Mode	On Raspberry Pi A+/3A+: Self-Power On Other Models: Bus-Power or Self-Power
Output Voltage	DC 5V
Output Current	Bus-Power: maximum 500mA for all ports Self-Power: maximum 2A for all ports
Static Current	~1mA
Operating Temperature	0°C~70°C
Storage Temperature	-20°C~80°C
Humidity	0~80%RH, no condensing

Powering Mode

A USB hub could be powered by the USB bus (bus-power mode), or be powered by the power supply (self-power mode). Bus-power mode is simpler as it does not need to have external power supply, but it has quite limited ability to power the devices on the USB hub. When you are trying to power more devices with higher current, it is recommended to use the self-power mode.

This USB hub supports both bus-power mode and self-power mode.

Self-Power Mode

This USB hub in self-power mode can output up to 2,000mA current for all USB ports.

When you attach Ace4U USB hub to Raspberry Pi A+ or 3A+, it will take power from Raspberry Pi, or supply power to Raspberry Pi, and work in self-power mode.

If you use a USB - micro USB cable to connect Ace4U USB hub to other models of Raspberry Pi, and you connect power supply to the USB hub (via the power micro USB port or the white JST XH2.54 2-pin connector on board), then it is still working in self-power mode. It will also back-power the Raspberry Pi, unless you remove the resistor R8 on board.

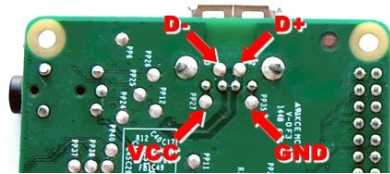
Bus-Power Mode

If you use a USB - micro USB cable to connect Ace4U USB hub to other models of Raspberry Pi, and you don't connect power supply to the USB hub, then it will work in bus-power mode, and it will draw power from the USB bus on Raspberry Pi. In this case it can output up to 500mA current for all USB ports.

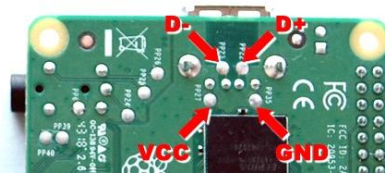
Usage Guide

Before attaching Ace4U USB hub to Raspberry Pi A+ or 3A+, please make sure the USB testing pads on Raspberry Pi are not covered by flux. In case they are, use a cotton bud to clean their surface with some ethyl alcohol. Or you can gently scratch their surface with tweezers. The purpose is to expose the metal surface of testing pads, so they could be contacted by pogo pins.

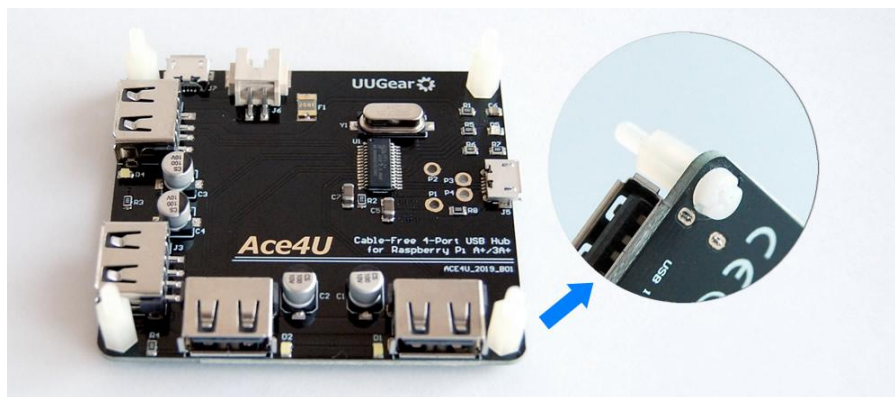
Raspberry Pi A+



Raspberry Pi 3A+



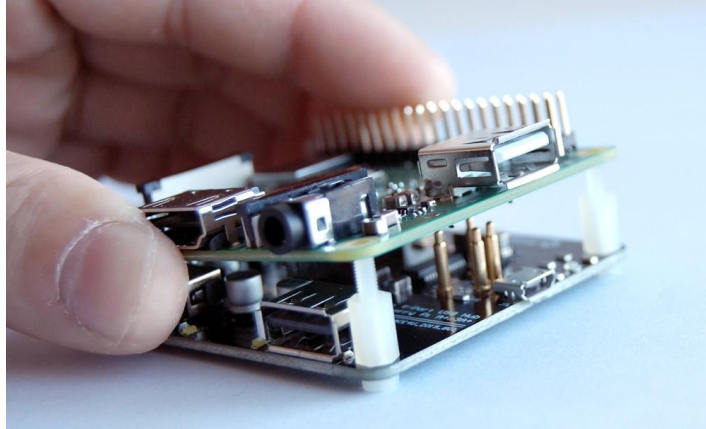
Now fix the male-female standoffs on Ace4U board with the plastic screws, as shown in picture below:



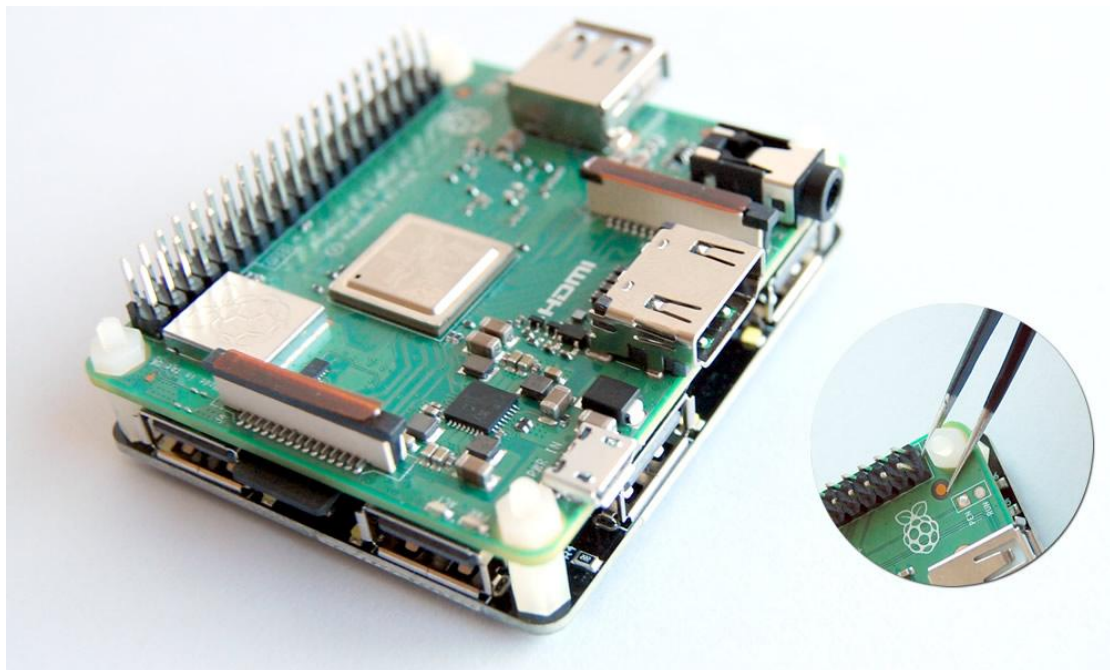
Use tweezers to place the 4 pogo pins into the holders on Ace4U board:



Place Raspberry Pi A+ or 3A+ on top of Ace4U board. Thanks to the 4 standoffs, the pogo pins in place will contact to the testing pads on Raspberry Pi accordingly.



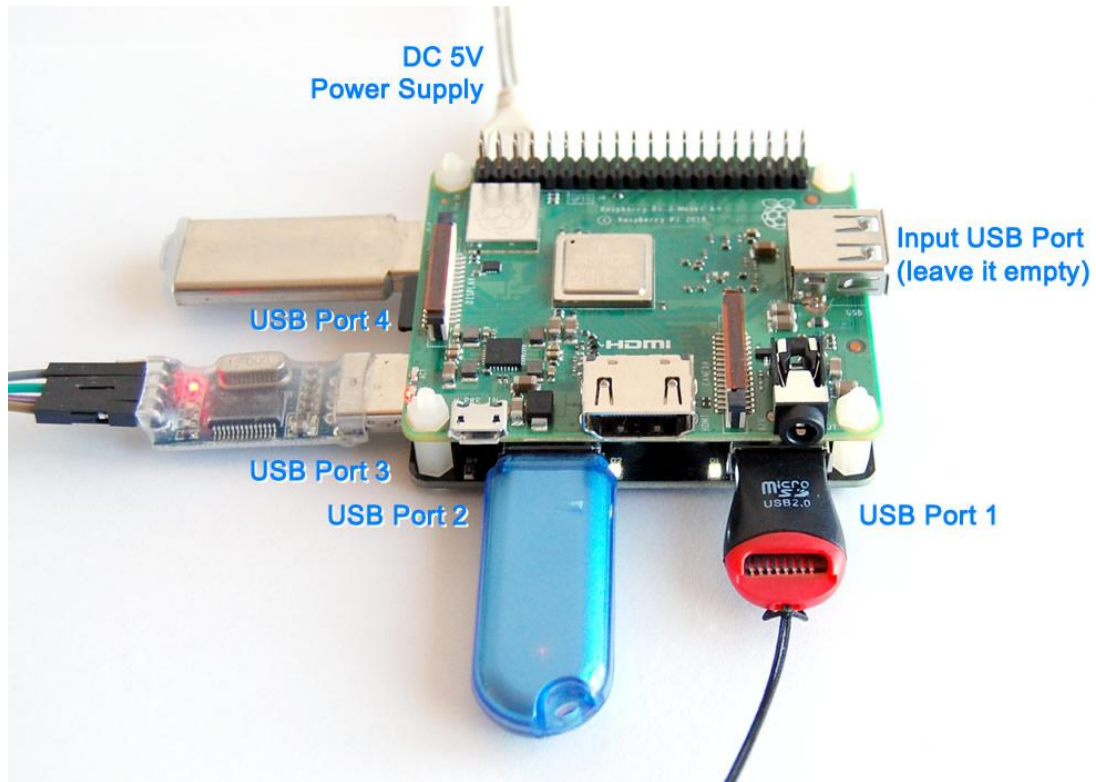
Use the 4 plastic nuts to firmly mount Raspberry Pi on top of Ace4U board. You may use tweezers to help fastening the nuts.



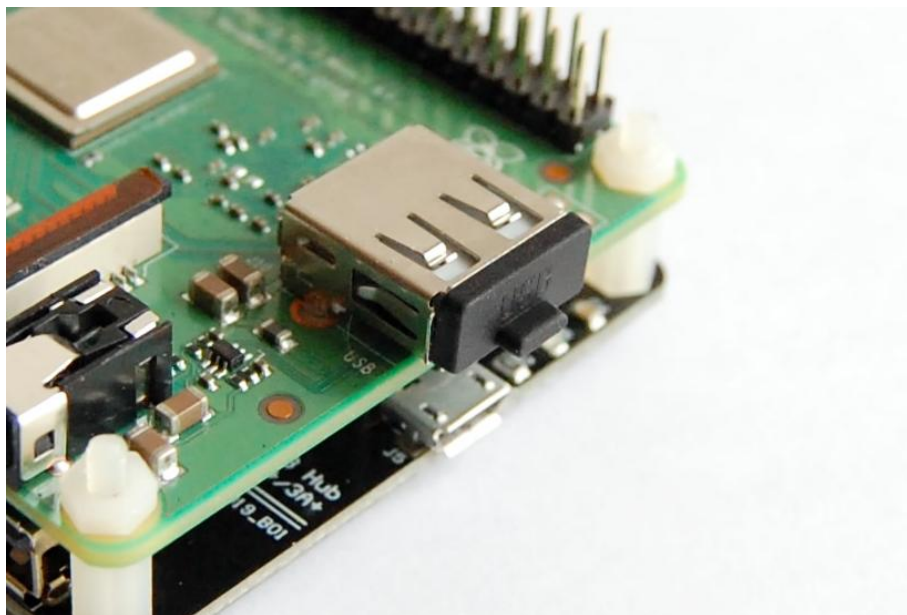
It is recommended to connect power supply to the “Power” micro USB port on Ace4U board (as shown in photo below). That way your Raspberry Pi will be back-powered via the pogo pins, and all USB devices connected to Ace4U will be powered directly by Ace4U, and that will significantly reduce the burden on pogo pins (only the current for powering Raspberry Pi will go through pogo pins).

The power indicator LED (orange) will light up once you connect the power supply to the board. If you plug USB device into any of the 4 USB ports, the port activity LED

(white) will light up accordingly, meaning the device is properly recognized.



Remarks: please do not plug any USB device to the only USB port on Raspberry Pi A+/3A+. Because that USB port has been occupied by Ace4U (as a USB hub). You may consider using [a rubber plug](#) to cover that USB port, so you won't unintentionally plug any USB device into it.

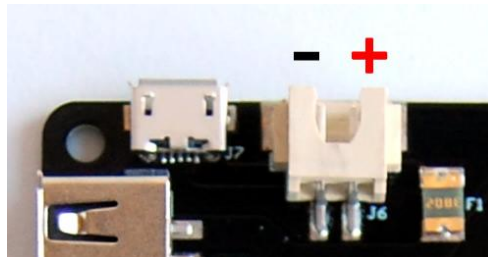




Remarks: this USB hub has only one transaction translator (TT) for all downstream USB ports. Please try not to connect any USB 1.1 device to the USB hub; otherwise all devices on the hub will be slowed down to the USB 1.1 speed (12 Mbps). If you only connect USB 2.0 devices to this USB hub, all of devices on the hub can work with USB 2.0 high speed (480 Mbps in theory), given they really support USB 2.0 standard.

Connect Power Supply to the XH2.54 connector

You can also connect the DC 5V power supply to the XH2.54 (white) connector on Ace4U. Please notice the positive pole is on the right.



You can find cable with male XH2.54 connector in our store (e.g. [this one](#) and [this one](#)).

Remarks: do not connect two different power supplies to the power micro USB port and the XH2.54 connector at the same time, otherwise they might fight with each other and could get damaged!

Connect Power Supply to Raspberry Pi

If you don't like back-powering your Raspberry Pi, connecting power supply to the micro USB port on Raspberry Pi will also work. However, this will increase the burden on pogo pins, since all current for USB devices will go through the pogo pins (from Raspberry Pi to Ace4U board).

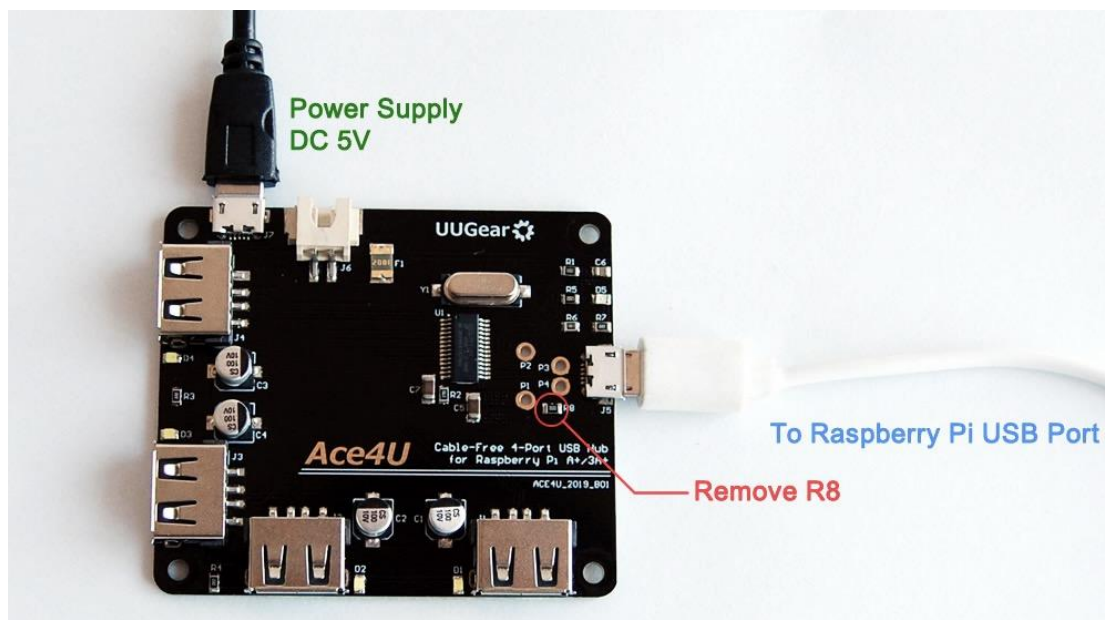
Connect Ace4U to Other Models of Raspberry Pi

If you want to connect Ace4U USB hub to other Raspberry Pi models, you will need a USB - micro USB cable (not included in the package).



In the picture, Ace4U USB hub is powered by the USB bus on Raspberry Pi. This will limit the output current to 500mA for all USB ports on the hub.

If you also connect an alternative power supply to Ace4U USB hub (via the power micro USB port or XH2.54 connector on board, as shown in figure below), the USB hub will work in self-power mode and it can output up to 2A current for USB ports. In this case, it is better to remove the resistor R8 on Ace4U board, to completely separate the power source for Raspberry Pi and Ace4U USB hub.



Troubleshooting: USB Hub Not Recognized

After you connect Ace4U to Raspberry Pi A+/3A+ and have power supply connected, the orange LED should light up. If you connect USB device to the USB port on Ace4U, the white LED should light up accordingly. If you type “lsusb” command in the console, you should see the 4-port USB hub get listed:

```
pi@raspberrypi:~ $ lsusb
Bus 001 Device 002: ID 1a40:0101 Terminus Technology Inc. 4-Port HUB
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
pi@raspberrypi:~ $
```

What to do if your Ace4U (USB hub) is not recognized?

If you are mounting Ace4U under Raspberry Pi A+/3A+, please make sure the **4 pogo pins are all well contacted to testing pads** on the Raspberry Pi. Use tweezers to gently adjust the pogo pins if necessary.

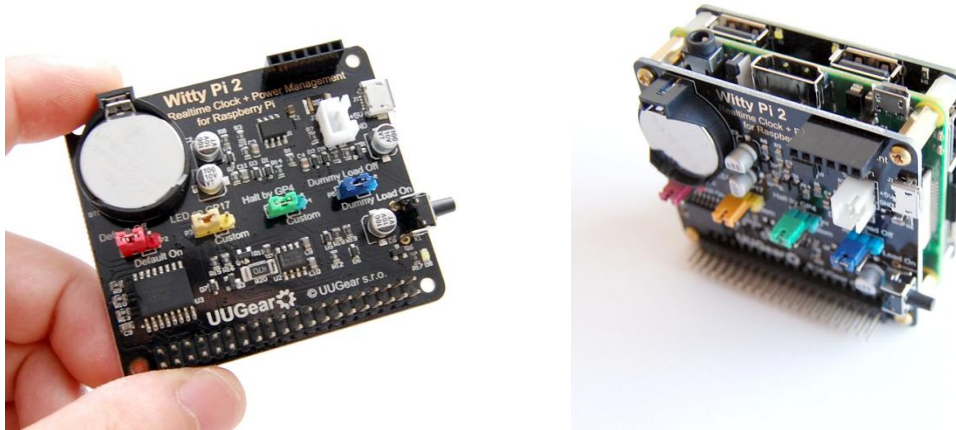
Acrylic Case

If you want to put Ace4U and Raspberry Pi A+/3A+ into a case, you can find [our Acrylic case here](#).

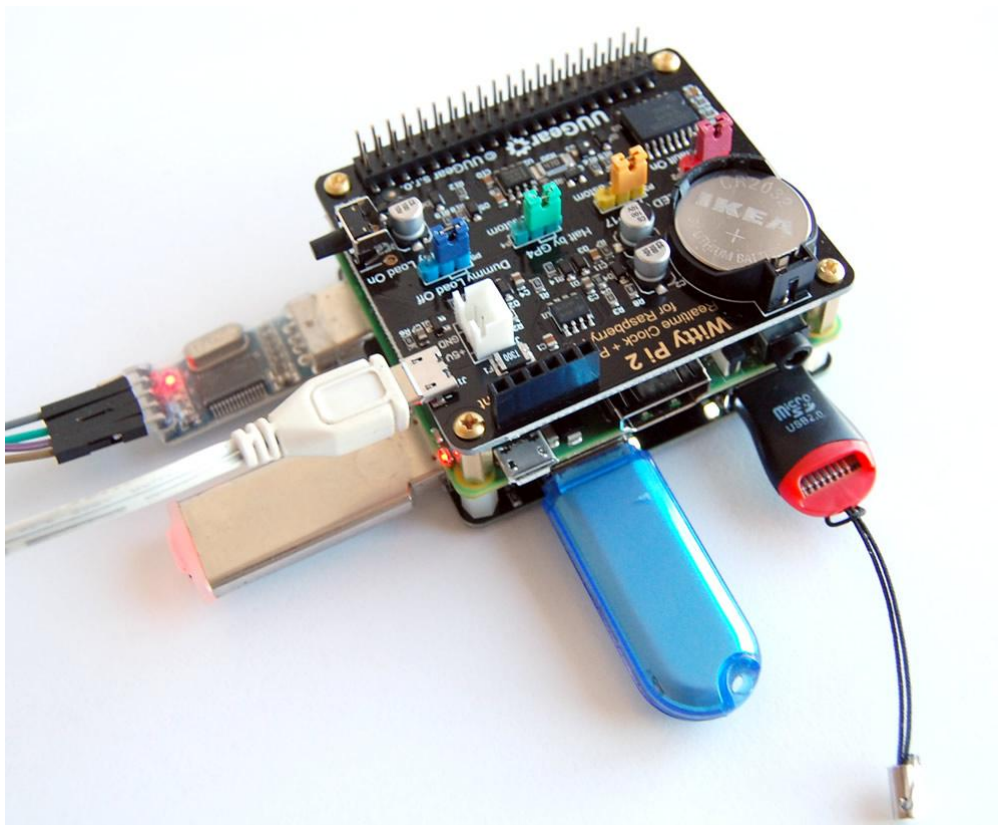


Integrates with Witty Pi 2

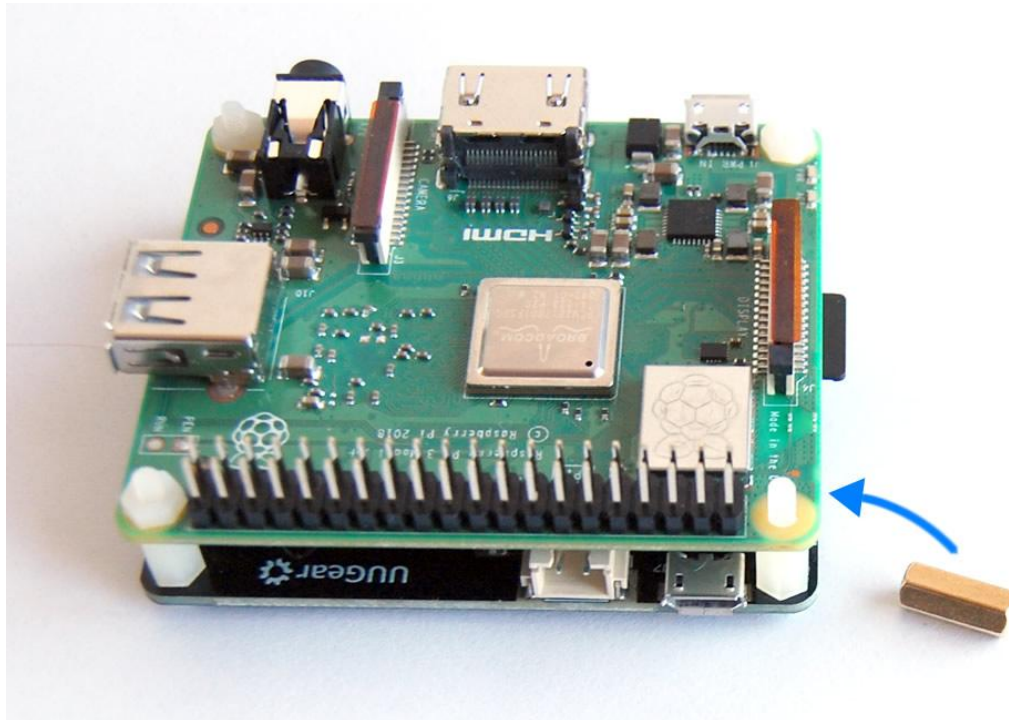
[Witty Pi 2](#) is another UUGear product, which is a small extension board that can add realtime clock and power management to Raspberry Pi. It can be mounted above Raspberry Pi by connecting to the 40-pin GPIO header.



Since this USB hub can be mounted under Raspberry Pi, it has no conflict with Witty Pi 2. Instead it can be easily integrated into the Witty Pi 2 + Raspberry Pi combination and become a nice sandwich structure.



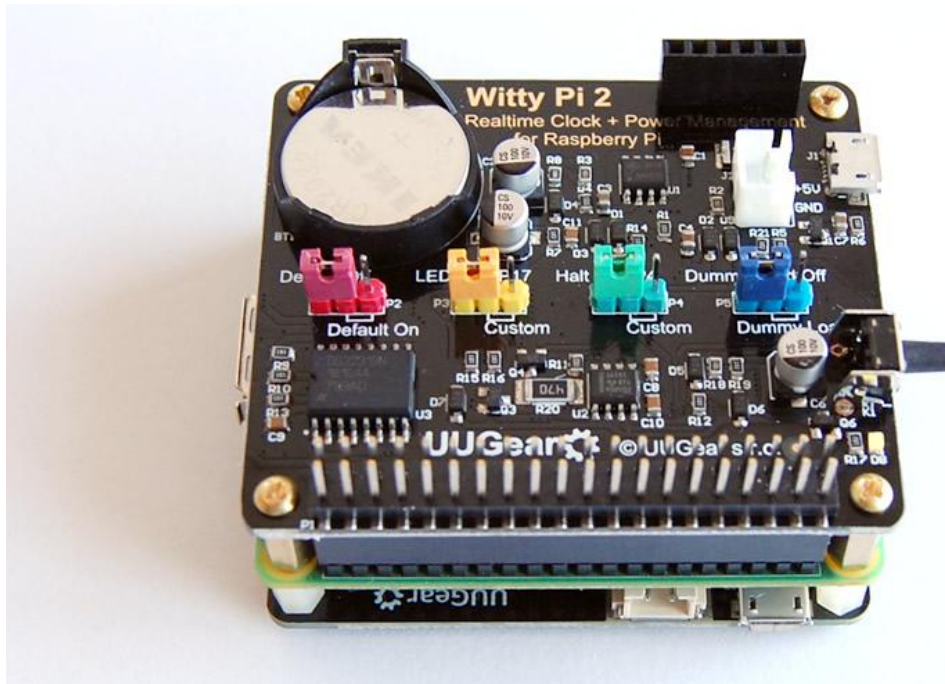
In order to firmly mount Witty Pi 2 on top of Raspberry Pi + Ace4U, you need to replace the plastic nuts with the copper standoffs come with Witty Pi 2.



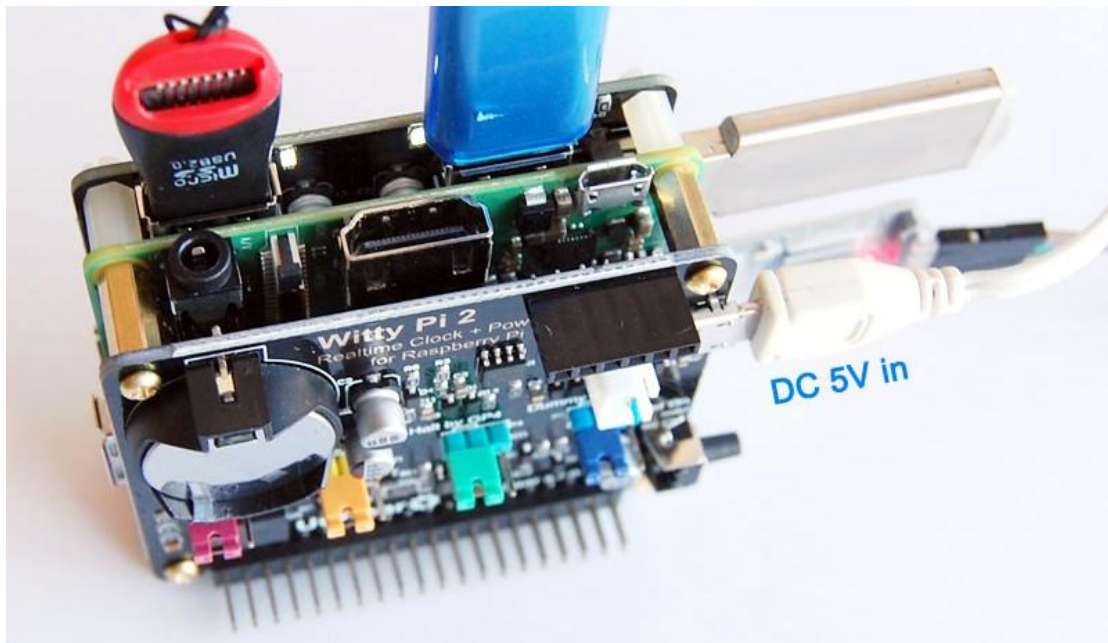
After finishing the replacement you will get:



Then you can mount Witty Pi 2 on top of it, and fix it with 4 copper screws.



Remarks: Witty Pi 2 needs to control the power, so the power supply should be connected to Witty Pi 2 (as shown in figure below). Witty Pi 2 will power Raspberry Pi A+/3A+, and Ace4U will get power via the pogo pins.



Revision History

Revision	Date	Description
1.00	2019.02.19	Initial revision