

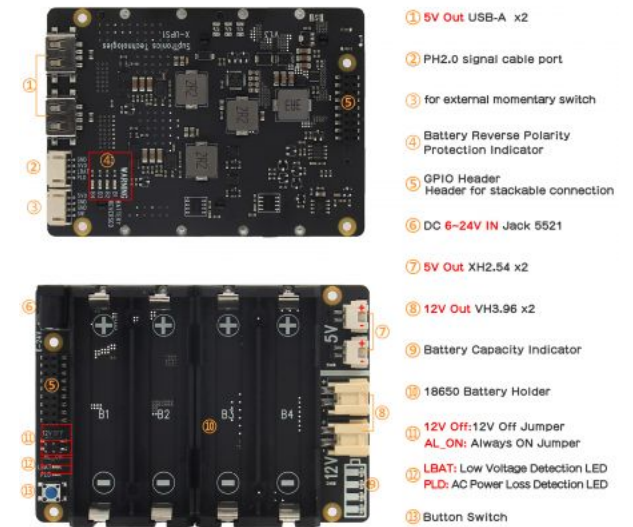
X-UPS1

Overview

The X-UPS1 is an universal stackable uninterruptible power supply (UPS) shield for most Single-Board Computers (SBC) that uses 12Vdc or 5Vdc. The UPS ensures that in event of power interruption, a battery or any other power source will intervene without any effect on your board.

Our convenient stackable design allows you to connect several UPS modules on your boards to provide long-lasting & higher output power.

Features



X-UPS1 V1.3 Interface Schematic

| | |
|---------------------|---|
| For use with | <p>Most Single-Board Computers (SBC) that uses 12Vdc or 5Vdc,</p> <ul style="list-style-type: none"> ▪ SBC Example: Orange Pi 5 / Jetson Nano / Raspberry Pi / Tinker Board / Arduino etc. |
| Key Features | <p>Power Input</p> <ul style="list-style-type: none"> ▪ Integrated high efficiency stepdown DC/DC converter ▪ Wide 6V to 24V operating input range ▪ Up to 95% Efficiency ▪ Allows powering from a car, a solder panel and other power sources ▪ Most common power input jack: 5.5x2.1mm <p>Power Output</p> <ul style="list-style-type: none"> ▪ Provides dual 12Vdc & 5Vdc or single 5Vdc output ▪ Each board provides max 12V/3A or 5V/3A power backup ▪ Can be stacked to increase output current and battery life ▪ Total output current could be 3A multiplied by the quantity of boards. For example, one X-UPS1 can output 3A, two are 6A, three are 9A, and so on ▪ Reverse Current Protection ▪ Integrate Advanced Power MOSFET with Equivalent of 7mΩ RDS(ON) to reduce power loss <p>Battery Charging</p> <ul style="list-style-type: none"> ▪ Supports 3000mA fast battery charging ▪ Battery over current protection and over voltage protection ▪ Protection of battery cell Reverse Connection ▪ Low battery detection (LED and 3.3V level output) ▪ Onboard 4 green LEDs indicate battery charging and discharging levels of 25%, 50% , 75% and 100% ▪ 18650 4cell lithium Ion holders ▪ When stacked, multiple power adapters can be used to charge at the same time <p>Power Control</p> <ul style="list-style-type: none"> ▪ Onboard push button to control power on /off (PressON, Hold the button pressed at least 3s OFF) ▪ Onboard LEDs shows the status of power output |

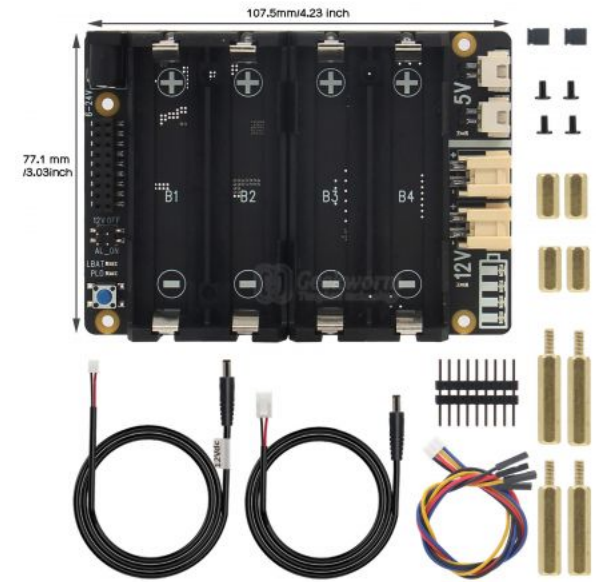


Sackable & universal UPS shielded, 12V & 5V dual output voltage for all SBC

- AC power loss or power adapter failure detection (LED and 3.3V level output)
- Jumper setting to enable Auto power on when power applied or restored
- Jumper setting to disable 12V output
- Ultralow standby power consumption to maximize battery life
- Advanced system powerpath management avoids batteries frequent charging and discharging

Misc

- Power output connectors : VH3.96 x2 (12V) / XH2.54 x2 (5V) / USB TypeA x2 (5V)
- PH2.0-4P for external power switch
- PH2.0-4P for **LBAT** (low battery) and **PLD** (AC power loss) detection)
- **LBAT**: A high level will be triggered when the battery voltage is lower than or equal to 3V (You can't modify this threshold of 3V)
- **PLD**: (AC power loss detection), When the external power supply is disconnected, it will trigger a high level, and the indicator light will be on
- You can program it yourself to read the above PLD and LBAT pin GPIO signals to achieve your own more advanced functions such as **low battery monitoring** and **power failure detection**, which can be referred to the **plsd.py** file of X708-script. We do not provide example programs



X-UPS V1.3 Accessories & Dimension

Spec

- **Power input (Single board) : 6-24Vdc ±5%, ≥3A**
- UPS output voltage : 12Vdc ±5%, 5.1Vdc ±5%
- UPS output current (Single boards) : Max 3A
- UPS output current (Stackable boards) : 3A x No. of the boards
- UPS charging current (Single board) : 2.3~3.2A
- Terminal Battery Voltage : 4.24V
- Battery Recharge Threshold : 4.1V
- Battery low detection: ≤3V

Note

Notes for stackable application:

1. All power input are connected together via the 18-pin female header, output current is subject to the quantity of boards.
2. You can use same one board to turn on/off all stackable boards. (be noted that which board you press the button to turn on, also must the same board to turn off.)
3. Only one AL_ON jumper caps be shorted to enable Always Power On when stacked multiple x-ups1 shields.
4. When stacking more than 2 X-UPS1 boards, if you want to disable the 12V OUT,

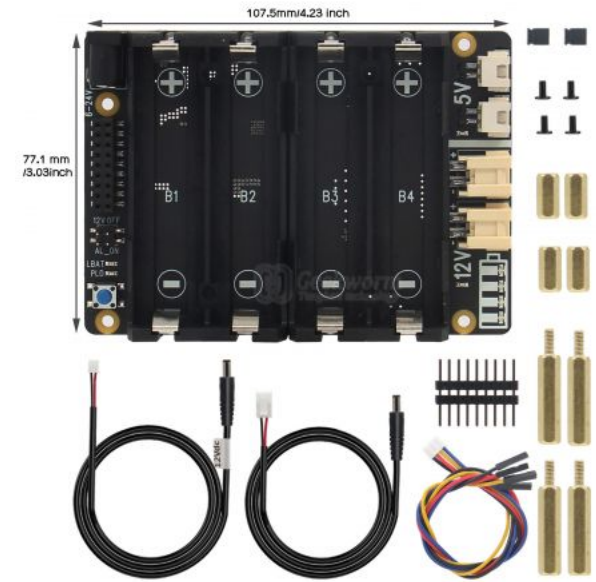
you have to short ALL the 12V OFF. If one of them is not shorted, the 12V OUT will occur.

Packing List

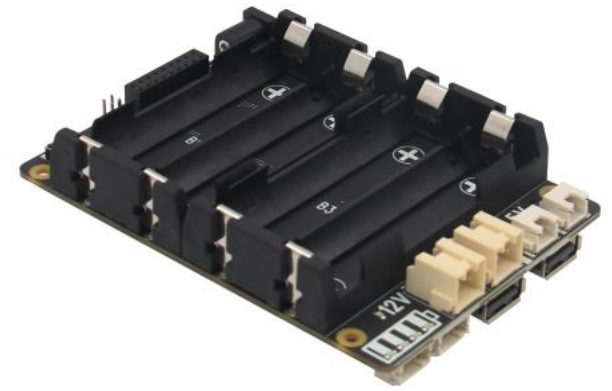
- 1 x X-UPS1 Expansion Board
- 1 x VH3.96 to DC5525 Cable (50cm length, to 12V output)
- 1 x XH2.54 to DC5521 Cable (50cm length, to 5V output)
- 1 x 4Pin PH2.0 to dupont cable (30cm length, this is a signal & 5V Output Cable)
- 1 x GPIO Header
- 2 x Jumper link Pitch 2.54mm
- 4x Spacer F/F M2.5x10mm
- 4 x Spacer M/F M2.5x25+6mm
- 4 x Screw M2.5 x 5mm

User Manual

1. X-UPS1 V1.3 Jumper Cap & Button Switch Guidance:



X-UPS V1.3 dimension



X-UPS1 V1.3



X-UPS1 V1.3

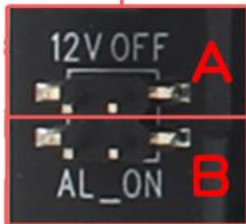


X-UPS1 V1.3



X-UPS1 UPS with Acrylic Plate

Jumper Cap & Button Switch Function



A: 12V OFF

Short - 12V OUT is disabled.
Open - 12V OUT is enabled.

B: AL-ON: Power always ON

Short - Power always on, power button disabled
Open - Press button to switch on, press 2-3s to switch off

Although multiple X-UPS1 are stacked, only one is shorted to achieve this function



Any button switch is available when stacking multiple X-UPS1;
But **MUST** use the same switch to power on/off.
When stacking multiple X-UPS1, if you want to disable 12V out,
MUST short **ALL** 12V OFF jumpers.

2. Guide based on the Raspberry Pi 5;

If you are using the X-UPS1 with the Raspberry Pi 5, you will need to do the following configuration on the Raspberry Pi 5:

From the command line or Terminal window start by running the following command :

```
sudo rpi-eeeprom-config -e
```

Change the setting of **POWER_OFF_ON_HALT** from **0** to **1** ,

Add **PSU_MAX_CURRENT=5000** at the end of the file that reads like this:

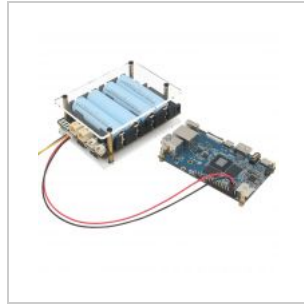
```
GNU nano 7.2 /tmp/tmpf9i3trrp/boot.conf
[all]
BOOT_UART=1
POWER_OFF_ON_HALT=1
BOOT_ORDER=0xf41
PSU_MAX_CURRENT=5000
```

Then reboot your Raspberry Pi 5 to make the change take effect.

```
sudo reboot
```

Application

Compatible with Most Single Board Computers (SBC) that uses 12Vdc or 5Vdc, SBC Example: Orange Pi 5 / Jetson Nano / Raspberry Pi / Tinker Board / Arduino etc.



X-UPS1 for Raspberry Pi X-UPS1 for Orange Pi X-UPS1 for Jetson Nano

PCB Dimension

X-UPS1 Dimensions source file (DXF): <File:X-UPS1-PCB.dxf> - You can view it with Autodesk Viewer online

SAFETY INSTRUCTIONS AND WARNINGS

- You must read these safety instructions and warnings before charging your batteries.
- Lithium Polymer and Li-ion batteries are volatile. Failure to read and follow the below instructions may result in fire, personal injury and damage to property if charged or used improperly.
- Never make wrong polarity connection when charging and discharging battery packs. Always double check polarity of battery's connector to make sure "+" to "+" and "-" to "-".
- Do not mix and use old batteries and new batteries, or batteries with different brand names.
- Lithium batteries has it's cycle life, please replace old battery with new one when it reaches it's service life or when it is two year old, whichever comes first.
- When charging Battery Pack, please put battery in a fire proof container. Please don't leave the X-UPS1 on the wood material or carpet and unattended.
- Must keep the X-UPS1 away from children.
- Please watch Main Video and Tutorial Video regarding 18650 batteries at: <https://www.staysafebattery.com/en/>
- Battery Recommend for X-UPS1 board, please refer to: <File:NCR18650B.pdf>

FAQ

Q: About X-UPS1 External PH2.0-4P Switch

A: The X-UPS1 has a JST PH2.0-4P switch connector reserved to allow you to use an external reset switch to fulfill the function of the on-board switch in

appropriate scenarios. Care needs to be taken to use the correct wiring sequence for your momentary self-reset switch, please refer to the silkscreen description on the PCB board, you can refer to [PSW19](#) or purchase it from <https://geekworm.com/products/power-control-switch-for-x820-or-x735>