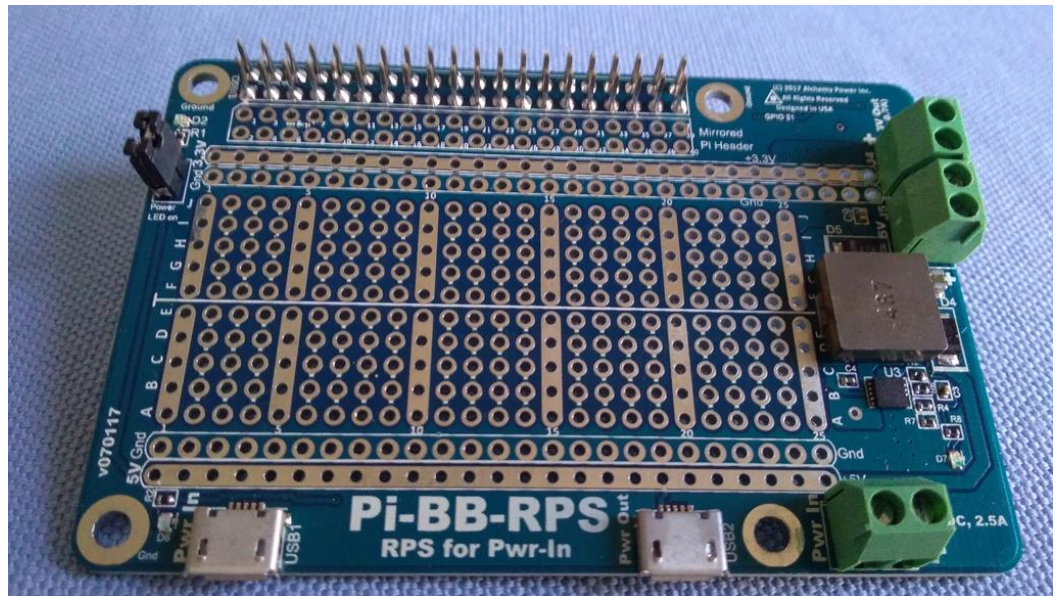


Key Features

- **Redundant Power supply (RPS).**
- **Input Power from DC power (7V-24V DC) or from USB. Vout 5V, maximum 2.5A.**
- **Provides both 3.3V and 5V power – ideal for prototyping.**
- **Prototyping breadboard with 250 connection points. Standard bread board spacing.**
- **Pre-installed Raspberry Pi 40-pin header. A mirrored 40 pin header provides access to all GPIOs.**
- **Dual layer – solder on top or bottom layer.**
- **LED indicator for power. LED can be turned off.**
- **GPIO 21 provides information on which power is active – USB or DC-DC converter.**
- **Ideal for Solar panel power or 12V power for the Pi.**

Pi-BB-RPS

- ***RPS¹: DC 7V - 24V & USB 5V/2A – ideal for solar powered Raspberry Pi***
- ***DC-DC converter on the board***
- ***Power out: 3.3V/0.7A and 5V/2.1A***
- ***Breadboard with 250 connections***



Pi-BB-RPS provides Redundant Power Supply capability. Second power is the micro-USB power. Power is switched seamlessly between these two sources. Priority is given to power source with higher power Voltage.

DC 5V and 3.3V is generated on the board. The 5V supply is provided to Pins #2,4 on the 40-pin HAT standard header. The board thus provide power to a Raspberry Pi via the 40-pin header or from USB out port. The mounting holes make it ideal to mount Pi-BB-RPS as a HAT.

USB power-out port provides 5V output power. Other USB devices such as another Raspberry Pi, Pi-UpTimeUPS board, some other USB devices (e.g. battery power bank, phone, LED light etc.) can be powered from this port. Using a Pi-BB-RPS with Pi-UpTimeUPS HAT can create a High Availability (HA) Raspberry Pi system.

¹ Redundant Power Supply (RPS)

Pi-BB-RPS offers the following:

- **Redundant Power Supply:** Provides seamless transition from one power source to another in case of a power failure. There are two power sources: DC 7V to 24V (via the terminal block) and the micro-USB power port.
 - Power switches over from one power source to another when power failure is detected.
 - Power status information via GPIO 21 on Raspberry Pi. GPIO can be disabled removing the jumper.
- **Power Supply Status:** GPIO 21 indicates Power Supply is active. GPIO 21 = 1 indicates DC 7V to 24V power supply is in use. GPIO 21 = 0 indicates USB power supply in use.
- **High Wattage Power In:** Power from terminal block is a minimum of 7V to a maximum of 25V, 2.5A (24V maximum recommended.) Ideal for use with a 9V, 12 V (hobby power supplies), 19 V (portable/lap-top power adapter) or 24 V power adapter. Can also be used with Solar Panels.
 - **5V power from this source is also available via a terminal block.** This terminal block is available next to the 3.3V terminal block. This allows use of a solar panel and charging a battery bank as well as powering a Raspberry Pi from the solar panel.
- **Power Out:** Provides 5V USB OTG capable power out and 3.3V/700mA power out. 3.3V is independently generated on Pi-BB-RPS board offloading the 3.3V power supply on the Raspberry Pi.
- **Breadboard:** More than 80% of connect-points of a Half -Size breadboard offering 25 columns x 10 rows or a total of 250 points. Five connection points are available for each column, for a total of 50 columns, making it convenient to attach any peripherals, break-out boards or electronic components.
- **Raspberry Pi Header:** Includes a 40-pin Raspberry Pi header soldered to the board. Also includes a mirrored header with solder points. Pi-BB-RPS follows the HAT guidelines. This allows Pi-BB-RPS to be connected to a Raspberry Pi as a HAT or to a flat 40 pin cable (e.g. as shown using a Adafruit Cobbler). Mirrored Raspberry Pi header allows access to all pins on the Header – including all GPIO's on the Raspberry Pi.
- **USB Power powers everything:** Power the Raspberry Pi, 3.3V bus, 3.3V out, USB-out, 5V bus with any one power supply being active. This includes the USB power or the DC 7V to 24V power.
- **Standard breadboard spacing:** Standard 0.1 inch or 2.54mm spacing – makes it convenient to attach resistors, diodes, Integrated Circuits (IC), circuit holders etc.
 - Arduino style connectors can be soldered onto the board to make it possible to connect to Arduino boards.
 - Arduino style connectors can be attached to create a bread board for use with jumper cables.
- **Dual layer:** Solder on top layer or bottom layer. Makes soldering and adding components easy.
- **LED indicators:** LED indicates when power is on - either from the USB source or the DC source. Disconnect the LED jumper to turn Power LED off. LEDs also indicate when each power source is active. These are not turned off (they turn off when there is no power to the power source!!!)
- **HAT Specifications:** Same dimensions as a Raspberry Pi. Mounting hole matches the Raspberry Pi HAT specifications, allowing Pi-BB to be mounted securely on top of the Pi.
 - Same dimension as a Raspberry Pi-3 or a Pi-2.
- **Uses:** Use with a Raspberry Pi or standalone for prototyping work. Use it as a 7-24V DC to 5V DC converter. Use it as a RPS for critical devices. Use with a battery bank for UPS power.

Redundant Power Supply Capabilities

- DC 7V to 24V, 2.5A power Input and the 5V USB power are the two power sources.
 - Primary source is determined by which power supply has a higher Power (Voltage).
 - Secondary power is in standby mode when Primary is on.
 - 5V power (stepped down from 7V-24V DC power) is available for use via a terminal block.
 - 5V power (RPS power) is available from the micro-USB connector
 - 3.3V power (RPS power) is available from the 3.3V terminal block.
- GPIO 21 indicates which power source is on.
- Secondary power or stand-by power, consumes very little power.
- When power fails on first source, the second source continues to provide power. The switch over happens when DC Power-In fails or falls below 6.5V
- Power sources can be a battery bank, solar panels, DC power adapters etc.

Specifications

Model Number: Pi-BB-RPS

Raspberry Pi Models supported

The board includes a 40-pin header. Any Raspberry Pi with a 40-pin header is supported. These are Pi 2, Pi 3, Pi Zero etc. Older Raspberry Pi models with a 26-pin header is not supported. Other Pi models conforming to Pi-HAT definitions also supported.

Input

USB Input power source: Micro USB OTG port on Pi-BB-RPS. Powers the Raspberry Pi, the 5V and 3.3V bus.

DC power source: DC from 7V to 24V DC, max 2.5A. Positive polarity marked on the board. Powers the Raspberry Pi, the 5V and 3.3V bus, USB-out and 3.3V out.

DC power source and USB Input power source provide the RPS functionality. Either power source is sufficient to power the Pi.

RPS: RPS functions are for USB Input Power and DC input power.

Active Power Supply Status: Available via GPIO 21. GPIO 21 "High" indicates 7-24V DC power source is active.

Output

USB OTG Output: Micro USB port on Pi-BB-RPS, typically 5.05V.

3.3V DC power: 3.3V (3.267 to 3.333 V), 700mA maximum. Available on terminal block.

USB Power Out Port: micro-USB-OTG ports. Output 5V 2.5A max.

Other Details

DC power connector & 3.3V connector: PA Nylon connector, 16-28 AWG wire, connector rated for 12A, 150V, 3.5mm pitch.

Switch Over Time: no delay, power is shared on a common bus and switches over.

Connect Points: 250 connections. Count does not include solder-points for 5V, 3.3V and Ground bus.

Connection points broken into 25 columns x 10 rows (labelled A-J).

Max Amps: Maximum of 2.5 Amps.

LED: Red color, power on indicator. Can be disabled by removing the shunt from the LED jumper. When shunt is in, LED is on.

Solder points: Drill size 1.4mm, Via size 1.9-2mm.

Header: 2x20 female header, soldered on Pi-BB following Raspberry Pi Hat guidelines for header location.

Mirrored header: Pin numbers indicated on board. Pin #1 also indicated by square via.

Heat Generated: Heat is generated on the inductor and DC-DC converter. For continued use of DC power source over 12V, it is recommended to use a cooling fan, heat sink or other cooling methods for the board. Hot areas are marked on the board.

Efficiency: Conversion efficiency for DC power source varies from 93% to 85%. The higher the input voltage, the lower the efficiency. Ideal operating Voltage is between 7V to 12V.

Dimensions

Board dimensions: 85mm x 56mm x 10mm (2.5" x 2.2" x 0.4"). Board same as a raspberry Pi.

HAT compatibility: The spacer mounting holes are HAT compatible.

CE Certification: Pending.

Weight: Less than 30 grams (1.1 oz.).

Warranty

90-day limited warranty.

Recommended Peripherals

Pi-BB: Bread board with 300 connect points.

Pi-EzConnect: GPIO connections for pi with a 40-pin header.

Pi-EzConnect-RJ45: GPIO Connections via RJ45 cables for Pi with 40-pin header.

Pi-16ADC: 16-bit, 16-channel Analog to Digital Converter (ADC) board.

Pi-Z-EzConnect: GPIO connections for Pi [Zero](#). Can also be used with Pi-2 and Pi-3.

PiZ-EzConnect KIT: Build your own connector for Pi (Pi Zero or Pi-2, Pi-3) using PiZ-EzConnect board. Soldering required.

PiZ-UpTime 2.0: UPS for a Pi Zero or Pi-2, Pi-3 or Pi-4.

Pi-UpTimeUPS 2.0: UPS for Pi-2 or Pi-3 or Pi-4.

Tiny-UPS: UPS in line with USB bus. Tiny form factor. Uses I²C for providing operating parameter information.

More details on recommended peripherals on Alchemy Power Inc. web site.

Environmental

RoHS Compliant. Electronic components, board etc. are RoHS compliant.

Operating Temperature: -40°C to +85°C.

Operating Humidity: 10% to 80% non-condensing.



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