

Raspberry Pi UPS 2.0 User Manual

Table of Contents

Safety First	1
Quick Start Guide	2
Software Install	2
Software Un-Install	2
Firmware Update	2
Firmware Recovery	3
List of Commands	3
-help	3
-board_info	3
-status	3
-charger <on / off>	3
-battery_type <LITHIUM / NIMH / ALKALINE>	3
-battery_full <auto / volts>	4
-battery_low <auto / volts>	4
-power_cycle <sec>	4
-power_off <sec>	4
-usb_v	4
-battery_v	4
-temp	4
-led <on / off>	5
-buzzer <on / off>	5
-usb_auto_on <enable / disable>	5
-usb_wake_up <on / off>	5
-timed_wake_up <on / off> <sleep_minutes>	5
-battery_wake_up <on / off> <voltage>	5
-i2c_find	6
-i2c_change_addr <new_addr>	6
-sw_rev	6
-read_conf	6
-fw_update <file_name>	6
-read_log	6
-clear_errors	6
Push Button Operation	7
LED and Buzzer	7
Document Revisions	8

Safety First

1. Battery powered devices are a serious fire hazard, never use damaged batteries or leave devices unattended.
2. Use protected battery packs from reputable sources. Protected meaning equipped with protection

circuits for over current, over voltage and other fault conditions. Lithium packs should be rated for at least 4.2V charging. The battery pack voltage should not exceed 5V

3. Never connect both AA batteries and a battery pack at the same time. Either use two AA cells or a battery pack, but not both at the same time.
4. When inserting AA batteries, please mind the polarity.
5. AA cells should be either NIMH or Alkaline type. If using Alkaline, please disable the battery charger function in the software. See **-battery_type** command description for details.

Quick Start Guide

1. Turn off the Raspberry Pi and disconnect power.
2. Connect the UPS to the Raspberry Pi with the supplied hardware.
3. Connect either two AA batteries or a battery pack. **Not both at the same time.**
4. Connect USB power to the UPS, **not to the Raspberry Pi.**
5. Connect any cables such as LAN, HDMI
6. Press and hold the push button until the UPS turns on.
7. After the Raspberry Pi boots up install the UPS software. See Software Install section below.
8. Setup the battery type using the **-battery_type <LITHIUM/NIMH/ALKALINE>** command
9. Enable/disable the battery charger with the **-charger_ <on/off>** command depending on the battery type.

Software Install

1. Download software from the product page on the website, copy it to any folder on the Raspberry Pi.
2. Unzip the .zip file, for example **sudo unzip <file_name>**
3. Go into the unzipped install directory, **cd ups_linux_1.0/install**
4. Make install.sh executable with **sudo chmod 777 install.sh**
5. Run **sudo ./install.sh -install**
6. Run **ups.sh -board_info** to read the board information and verify access
7. Run **ups.sh -help** to see a full list of commands
8. The .zip file and unzipped folder are not used any more, feel free to delete them.

Software Un-Install

1. Run **sudo /opt/ups/install.sh -uninstall**
2. If /etc/rc.local was modified to include start up scripts, these entries should be removed manually.

Note:

The default software install consists of the files stored inside /opt/ups folder as well as ups.sh inside /usr/local/bin.

Firmware Update

1. Download the new firmware from the website
2. unzip it, **sudo unzip <file_name>**

3. run *ups.sh -fw_update <file_name>*

Firmware Recovery

If something like a power loss during a firmware update “bricked” the unit, follow the steps below to recover it.

1. Power off the Raspberry Pi and disconnect USB power and batteries.
2. Wait 5 minutes for all capacitors to fully discharge
3. While pressing the push button, connect USB power to the UPS. The red led should start flashing to indicate that the unit entered firmware recovery mode.
4. Wait until the Pi boots up
5. Follow the regular Firmware Update instructions found in the user manual to update the firmware.

List of Commands

-help

Result : Prints a list of commands.

Example :

ups.sh -help

-board_info

Result : Prints the board information like PCB revision.

Example :

ups.sh -board info

-status

Result : Shows the real time information like USB voltage and battery voltage.

Example :

ups.sh -status

-charger_<on / off>

Result : Enables or disables the battery charger. This setting is saved in non volatile memory.

Examples :

ups.sh -charger_off

ups.sh -charger_on

-battery_type <LITHIUM / NIMH / ALKALINE>

Result : Selects the battery type. This setting is saved in non volatile memory.

Example :

ups.sh -battery_type NIMH

-battery_full <auto / volts>

Result : Setting to auto allows the charger to automatically determine when the battery is fully charged, depending on battery type. If set to a specific voltage instead of auto, then the battery charger will stop charging once that voltage is reached or if the battery is full before reaching that voltage. This setting is saved in non volatile memory.

Examples :

ups.sh -battery_full auto

ups.sh -battery_full 3.45

-battery_low <auto / volts>

Result : This setting effects when the UPS will power down when USB power is not present and the battery is running low. Setting to auto allows the UPS to determine the voltage automatically based on the battery type. Setting to a specific voltage will tell the UPS to power off once the battery voltage goes below this threshold. This setting is saved in non volatile memory.

Examples :

ups.sh -battery_low auto

ups.sh -battery_low 3.25

-power_cycle <sec>

Result : Turns off power after X seconds, X can be up to 255 seconds. Power will be turned back on automatically after a couple of seconds.

Example :

ups.sh -power_cycle 30

-power_off <sec>

Result : Turns off power after X seconds, X can be up to 255 seconds. Push button will have to be pressed to turn power back on.

Example :

ups.sh -power_off 30

-usb_v

Result : Prints the USB voltage.

Example :

ups.sh -usb_v

-battery_v

Result : Prints the battery voltage.

Example :

ups.sh -battery_v

-temp

Result : Returns the reading of the controller's internal temperature sensor in degrees Celsius. The accuracy of this reading can vary and shouldn't be relied upon to make important decisions.

Example :

ups.sh -temp

-led_ <on / off>

Result : Enables or disables the LED. This setting is saved in non volatile memory.

Examples :

ups.sh -led_off

ups.sh -led_on

-buzzer_ <on / off>

Result : Enables or disables the buzzer. This setting is saved in non volatile memory.

Examples :

ups.sh -buzzer_off

ups.sh -buzzer_on

-usb_auto_on_ <enable / disable>

Result : Enabling usb auto on allows the Raspberry Pi to be turned on right away on initial power up, instead of waiting for a push button press. This setting is saved in non volatile memory. Please note this command is just for initial turn on, it has no effect on sleep mode, the *-usb_wake_up_ <on/off>* command can be used to wake up from sleep when USB power is stable.

Examples :

ups.sh -usb_auto_on_enable

ups.sh -usb_auto_on_disable

-usb_wake_up_ <on / off>

Result : Enabling usb wake up allows the Raspberry Pi to wake up from sleep if the USB power is stable. The UPS enters sleep mode automatically if the USB power is not present and the battery is running low, or with the *-power_off command*, or with a long button press. Calling this command before the USP goes to sleep configure the UPS to wake up from sleep automatically once USB power comes back. This command should be called each time before the UPS goes to sleep, it's not saved in non volatile memory.

Examples :

ups.sh -usb_wake_up_on

ups.sh -usb_wake_up_off

-timed_wake_up_ <on / off> <sleep_minutes>

Result : Sets an alarm in minutes(0 to 65535) for the UPS to wake up from sleep mode. This needs to be enabled every time before going to sleep, it's not saved in non volatile memory.

Examples :

ups.sh -timed_wake_up_off

ups.sh -timed_wake_up_on 60

-battery_wake_up_ <on / off> <voltage>

Result : Tells the UPS to wake up from sleep once the battery is charged to the specified voltage, or if the battery is fully charged. This needs to be enabled every time before going to sleep, it's not saved in non volatile memory. Please note that if the specified battery voltage is not reached, but the battery is fully charged, the UPS will still wake up. So to fully charge the battery set a voltage higher than the maximum, for example 10V. Also make sure the charger is enabled.

Example 1: Wake up once the lithium battery pack is charged to 3.65V

ups.sh -battery_wake_up_on 3.65

Example 2: Wake up once the lithium battery pack is fully charged.

ups.sh -battery_wake_up_on 10.0

Example 3: Disable wake up based on battery voltage.

ups.sh -battery_wake_up_off

-i2c_find

Result : Finds the device on the I2C bus, and updates I2C_ADDR variable inside the .conf file.

Example :

ups.sh -i2c_find

-i2c_change_addr <new_addr>

Result : Changes the I2C address, and updates I2C_ADDR variable inside the .conf file.

Example :

ups.sh -i2c_change_addr 25

-sw_rev

Result : Reads the Linux software revision

Example :

ups.sh -sw_rev

-read_conf

Result : Prints the .conf file

Example :

ups.sh -read_conf

-fw_update <file_name>

Result : Updates firmware

Example :

ups.sh -fw_update <file.bin>

-read_log

Result : Prints important events that were logged to disk.

Example :

ups.sh -read_log

-clear_errors

Result : Clears all the warnings and errors.

Example :

ups.sh -clear_errors

Push Button Operation

The push button is used to turn power on/off. To turn power on, press and hold the push button for a couple of seconds until the Raspberry Pi LEDs come on. To turn power off press and hold the push button for a couple of seconds until the LED starts flashing, the UPS will then wait 60 seconds, turn off power and enter sleep mode. The Raspberry Pi will detect the turn off button press and automatically call “sudo poweroff” to safely power off.

LED and Buzzer

If the UPS switches to battery power the LED will toggle at a rate of 1 second on and 1 second off. Once the battery starts to run low the frequency will increase, and finally when the battery is critically low the UPS will start to power off and the LED frequency will increase again. Both the led and buzzer can be disabled/enabled individually.

www.rpigeear.com

Document Revisions

Rev 2.0 :

- Original user manual for PCB revision 2.x hardware.

Rev 2.1 :

- Added -sw_rev command.
- Removed FAQ section, will keep it on the webpage.

www.rpigeer.com