CW2. PiUPS+

Documentation CW2. PiUPS+

Contents

List of Figures

Part I

Introduction

1 Function

The PiUPS+ is an extension board for the Raspberry Pi. This extension can be used to ensure that the Pi is shut down in a safe manner in event of power failure. Corrupt and defective file systems on the SD card are therefor a thing of the past with this. In order to monitor the status of the PiUPS+ and be able to control it, the PiUPS-Monitor is available that must be installed on the operating system of the Pi.

- Shutting down the Raspberry Pi in a safe manner

- Bridging longer power failures

- Switching off the Pi's manually via the button on the PiUPS+

2 Technical information

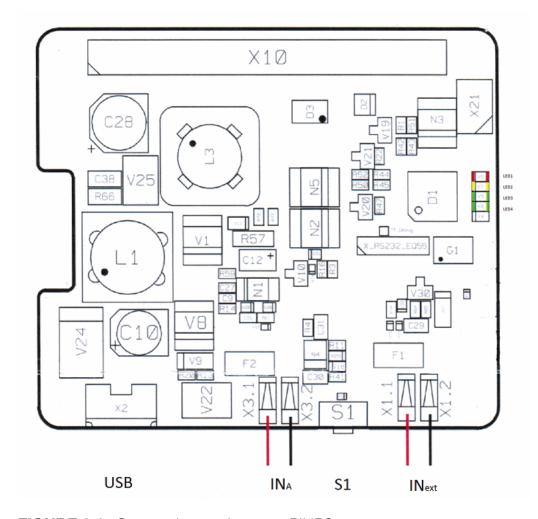| Input primary voltage USB	+5VDC MicroUSB
Input primary voltage alternative	+5VDC bis +25VDC
Output current	up to 2,000mA[1]
Output voltage	+5VDC +- 0.2V
Communication	I²C via address 0x30
Dimensions	L x W x H: 65 mm x 56.5 mm x 20 mm (corresponds with Raspberry Pi HAT specification)

2.1 CONNECTING DIAGRAM

FIGURE 2.1: Connecting assignment PiUPS+

---

[1]depending on the power supply or rechargeable battery used

USB	MicroUSB-Buchse
INa	Connection of the rechargeable batteries (red = +, black = -)
INext	Alternative primary input. Permissible voltage +5VDC to +25VDC (red = +, black = -)
S1	Switch for switching on / off (configuration via jumpers on the bottom)
LED1 (red)	LED illuminates: operation via both rechargeable battery, LED flashes: rechargeable battery not connected or is defective
LED2 (yellow)	Status display of the rechargeable battery. LED flashes: rechargeable battery charging, LED illuminates continuously: rechargeable battery charged
LED3 (green)	Status display PiUPS+. LED flashes: UPS operates correctly
LED4 (green)	Operation of the primary input

2.2 RECHARGEABLE BATTERY

The PiUPS+ can charge rechargeable batteries with the following specifications using the connection of the INa (Figure 2.1).Other rechargeable batteries / batteries must not be used under any circumstances.[2]

Technology	Lithium Ion (Li-Ion) or Lithium Polymer (LiPo)
Cells	1
Capacity	min. 300mAh
Voltage	+3.7V
Discharge current	min. 3A
Charge voltage	+4.2V
Charge current	100mA

---

[2]CW2. accepts no liability for damage caused by using other rechargeable batteries / batteries.

Part II

Installation

3 Hardware

Before commissioning the PiUPS+, you have to connect the rechargeable battery and configure the button as desired. We shall describe the precise process to you in the following steps.

3.1 SETTING THE BUTTON

The behaviour of the button of the PiUPS+ can be set using a jumper on the bottom of the PiUPS+. If you want to start the Pi manually via the button, you must insert the jumper in such a manner that it bridges both contacts.
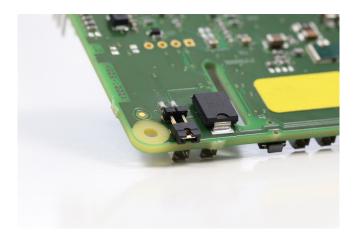

FIGURE 3.1: Start jumper configuration manually

If the Pi should be started automatically as soon as voltage is available at one of the primary inputs, insert the jumper so that the contacts are not connected.

FIGURE 3.2: Start jumper configuration automatically

3.2 CONNECTING THE RECHARGEABLE BATTERY

ATTENTION! Please only use rechargeable batteries on this connection that have the specifications mentioned above. Other rechargeable batteries or batteries may lead to damaging the UPS and the Raspberry Pi!

Before you mount the PiUPS+ on the Pi, we recommend that you connect the rechargeable battery to the PiUPS+. In doing so, take care not to reverse the poles of the contacts for the rechargeable battery.

Generally, the rechargeable battery has a red braid and a black braid. Now please connect the connections of the rechargeable battery to the PiSUV+ as shown in the following figure.
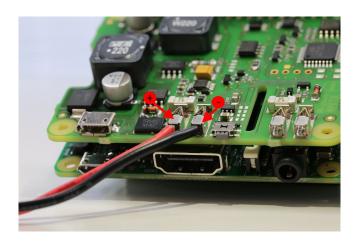

FIGURE 3.3: Connecting the rechargeable battery

3.3 INSTALLATION OF THE PIUPS+ ONTO THE RASPBER-RYPI

Now you can attach the PiUPS+ onto the RaspberryPi. Please note that in doing so, the pins of the GPIO ports cannot be inserted offset and the UPS cannot be attached to the Raspberry the wrong way around. This could lead to the destruction of the Pis and the PiUPS+.
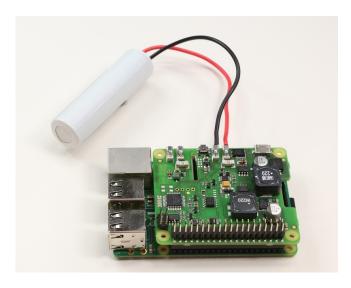

FIGURE 3.4: PiUPS+ on the Raspberry Pi with rechargeable battery

3.3.1 RASPBERRY PI MODEL A AND B

In order to be able to use the PiUPS+ wit Raspberry Pi model A or B, you need an adapter. Attach the adapter to the GPIO port of the Raspberry and ten the hPiUPS+ to the adapter as you can see in figure 3.5.

FIGURE 3.5: PiUPS+ with adapter

3.4   CONNECTING THE PRIMARY VOLTAGE

In order to be able to start the system, now you have to connect the primary voltage to the PiUPS+. Please do not use any USB power pack or active USB hubs on the Raspberry Pi. These may influence the function of the PiUPS+ so that switching off the system in a safe manner in event of power failure is not guaranteed.

3.4.1   USB

You can use the USB port on the PiUPS+ to supply the system with voltage. Depending on the configuration of the button, the system starts automatically or after you have pressed the button.
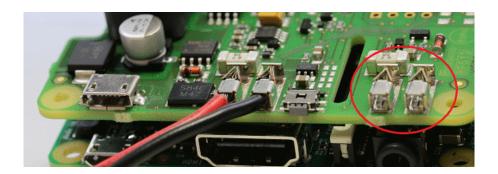
3.4.2   ALTERNATIVE INPUT

FIGURE 3.6: Alternative primary input

You can connect a voltage source with +5V to +25V to the alternative input. Please take note of the correct polarity when connecting (Figure 2.1)! These voltage sources are used instead of the USB port. The input is also monitored in the same manner as the USB port and in event of a power failure, the PiUPS+ automatically switches to the rechargeable battery connected in all cases.

4   Software

4.1   CONFIGURATION

You can influence the behaviour of the PiUPS monitor via the configuration. You have the following parameters at your disposal:

ShutdownTimer=<Time in seconds>

This value specifies how long the system continues to run after the voltage supply has switched to the rechargeable battery. Values between 1 - 999.999.999. are possible.

PowerOffTimer=<Time in seconds>

This value specifies how long the PiUPS+ should still stay switched on after the command to shut down has been sent. A value between 1 - 255 can be entered here.

ShutdownCmd=<Command line>

This option is used to specify a command that should be used to shut down the PiUPS+. Here, e.g., you can enter the command for switching off or store your own script . If you store your own script, take care that the operating system is shut down by the script.

LogLevel=<notice|error|debug>

With this option, you can control which entries should be stored in the log.

LogStatusDesc=<0|1>

This command is used to influence if only a numeric value is logged for this value when changing the status, or a description as well.

4.2   RASPBIAN

Please download the current version of the des PiUPS monitor for the PiUPS+ from the support screen:

http://piups.net/support/

4.2.1   PREPARING FOR INSTALLATION

In order to allow the PiUPS monitor to operate correctly, the I²C-Bus must be activated first. Good instructions can be found the following screen:

https://learn.adafruit.com/adafruits-raspberry-pi-lesson-4-gpio-setup/configuring-i2c

4.2.2   INSTALLATION

In order to be able to install the package under Raspbian, you must execute the following command in the directory with the package downloaded.

```
sudo dpgk -i piupsmon-0.8.deb
```

4.2.3   USEAGE

When the PiUPS monitor is installed, you have the following commands available for starting and stopping the monitor:

```
sudo /etc/init.d/piupsmon start
```

```
sudo /etc/init.d/piupsmon stop
```

```
sudo /etc/init.d/piupsmon status
```

You can adapt the configuration in the following file:

/etc/piupsmon/piupsmon.conf

Do not forget to restart the PiUPS monitor after making an adjustment!

The PiUPS monitor also saves a log in the following file:

/var/log/piupsmon.log

4.3   MORE DISTRIBUTIONS

We will be releasing packages for further distributions within the next few weeks. We shall also make the source text of the PiUPS monitor available online within the next few days.