Safe-power Raspberry Pi UPS datasheet

TG Tronx 13/07/2019

Technical data	
max input voltage	5.4V
max current while not charging Lipo cell	2 mA
max current charging Lipo cell	250 mA
Temperature range	$0\,^{\circ}$C $32\,^{\circ}$F to $50\,^{\circ}$C $122\,^{\circ}$F
rechargeable Battery	Lipo 3.7V
time to shutdown after power failure	10s

Table 1: max ratings

Dimensions

The UPS comes in HAT form, specified by https://github.com/raspberrypi/hats but does not have the eeprom.

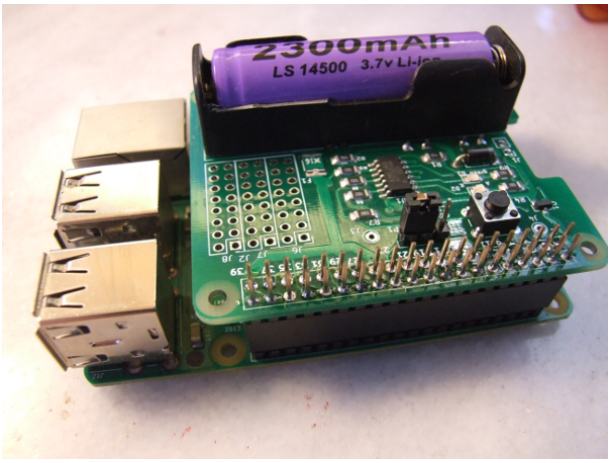


Figure 1: safe-power installed on Raspberry 2

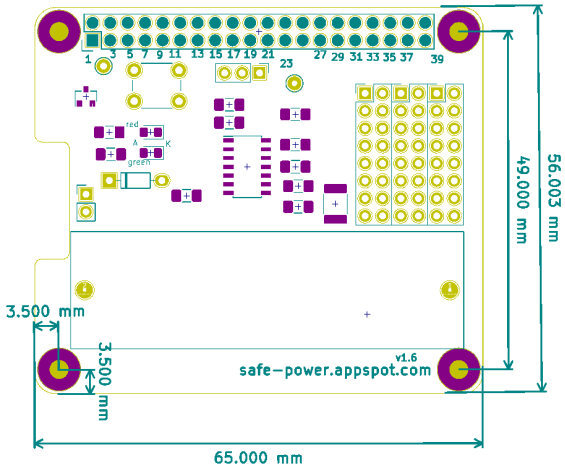


Figure 2: shield specification

onboard Lipo charging circuit

The TP4056 is a complete constant-current/constant-voltage linear charger for single cell lithium-ion batteries.
ABSOLUTE MAXIMUM RATINGS
· Preset 4.2V Charge Voltage
·Input Supply Voltage(V CC):-0.3V 8V
·BAT Short-Circuit Duration:Continuous
·BAT Pin Current:200mA
TP4056 Other features include current monitor, under voltage lockout, automatic recharge and two status LED to indicate charge termination and the presence of an input voltage.

operation

1. normal operation: the UPS monitors power constantly and blinks green
2. power fails for less than 10 seconds: the Raspberry is powered by the UPS
3.power fails for more than 10s: safe-power shuts the OS down and blinks red
4.the button is pressed during normal operation: manual shutdown- the OS shuts down -green and red blink
5.the button is pressed during manual shutdown: OS boot is initiated and UPS goes into normal mode after 30s

LED codes:

Steady green – power has been applied, Raspberry boots
Blinking green 2 seconds – normal operation power ok
Blinking red fast – power failure detected
Steady red – shutdown initiated (manual or after power failure)
Blinking red 2 seconds – power failure, Raspberry is shutdown
Blinking red and green 2 seconds – system in shutdown After manual shutdown by button
Blinking red and green alternating 5 times – Safe-power Microcontroller boots

shutdown operation

Full instructions on `http://safe-power.appspot.com/setup`

Save this script in /bin and execute it via crontab at boot time.

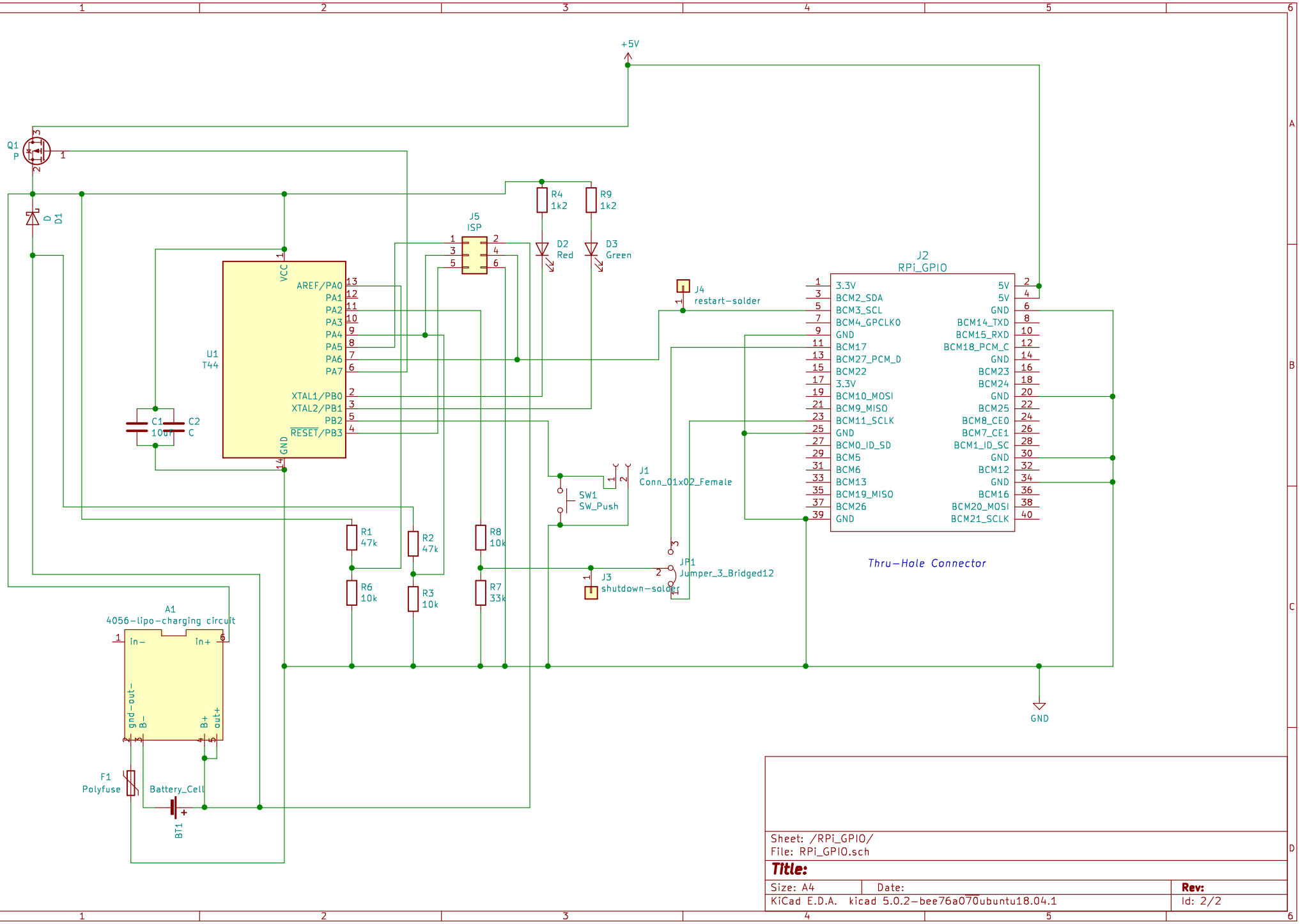
@reboot /bin/safe-power.py &

```
1
#!/usr/bin/env python
3 #script to shutdown the raspberry by safe-power raspberry UPS
#save this script as root under /bin/safe-power.py
5 #add this script AS LAST LINE of root's crontab in the following way
#  @reboot /bin/safe-power.py &
7 # important!! dont forget the "&"  in the end!!
#the script will be started in the background at reboot
9 #and safe power will be operational
import RPi.GPIO as GPIO
11 GPIO.setmode(GPIO.BCM)
import os
13 import time
# GPIO 11 = pin23 set up as input. It is pulled up to stop false signals
15 GPIO.setup(11, GPIO.IN, pull_up_down=GPIO.PUD_UP)
# now the program will do nothing until the shutdown signal on pin 23
17 # gets LOW.
#During this waiting time, your raspberry is not
19 #wasting resources by polling the pin

21 try:
    GPIO.wait_for_edge(11, GPIO.FALLING)
23
# warn all logged users of the shutdown event
25     os.system("wall shutdown by UPS")
#now the system will shut down
27     os.system("sudo poweroff")
#except if this script will be cancelled by the user explicitely
29 except KeyboardInterrupt:
    GPIO.cleanup()       # clean up GPIO on CTRL+C exit
31     GPIO.cleanup()           # clean up GPIO on normal exit
```

safe–power.py

Troubleshooting steps on `http://safe-power.appspot.com/setup`


+5V
Q1
P
D1
D
U1
T44
VCC
GND
AREF/PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
XTAL1/PB0
XTAL2/PB1
PB2
RESET/PB3
C1
10u
C2
C
R1
47k
R2
47k
R3
10k
R4
1k2
R6
10k
R7
33k
R8
10k
R9
1k2
J5
ISP
D2
Red
D3
Green
J4
restart-solder
J1
Conn_01x02_Female
SW1
SW_Push
J3
shutdown-solder
JP1
Jumper_3_Bridged12
J2
RPi_GPIO
3.3V
BCM2_SDA
BCM3_SCL
BCM4_GPCLK0
GND
BCM17
BCM27_PCM_D
BCM22
3.3V
BCM10_MOSI
BCM9_MISO
BCM11_SCLK
GND
BCM0_ID_SD
BCM5
BCM6
BCM13
BCM19_MISO
BCM26
GND
5V
5V
GND
BCM14_TXD
BCM15_RXD
BCM18_PCM_C
GND
BCM23
BCM24
GND
BCM25
BCM8_CE0
BCM7_CE1
BCM1_ID_SC
GND
BCM12
GND
BCM16
BCM20_MOSI
BCM21_SCLK
Thru-Hole Connector
A1
4056-lipo-charging circuit
in-
in+
gnd-out-
B-
B+
out+
F1
Polyfuse
Battery_Cell
BT1
GND
Sheet: /RPi_GPIO/
File: RPi_GPIO.sch
Title:
Size: A4
Date:
Rev:
KiCad E.D.A. kicad 5.0.2-bee76a070ubuntu18.04.1
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