RPIoner

A smart way to manage and
prevent failures of your
Raspberry PI...
...using Arduino

What are the problems?

Raspberry PI can' t work H24

Sometimes Raspberry PI is used as server always on. Usually, a common USB hard disk is connected to Raspberry PI but this kind of devices are not suitable to work H24. In this case, the time of life of the system inexorably becomes smaller.

Raspberry PI freeze

Leaving a Raspberry PI turned on day after day, have always the same effect: it will freeze.

What can be do?

- Turn it off and after 1 hour turn it on again every day.

- When it is on, watching that it is working good and if it freeze, do an hardware reboot.

How should it works?

Concept

Cause Raspberry have a serial port, we can easly connect Arduino and Raspberry together by this. We can suppose to develop a program for Arduino that "PING" the raspberry every 5 seconds. Another program run on Raspberry PI that reply with "PONG" for every "PING". If Arduino will not receive reply anymore, it means that Raspberry is going off or is frozen. In this case, Arduino turn off the power supply of Raspberry and after 1 hour it turn on as well.

Raspberry PI side

Raspberry PI will be programmed to turn off itself at a certain time (e.g. by atd daemon).

Raspberry PI will run a program that reply "PONG" when it receive a "PING" on its serial port. This program must start at boot.

Arduino side

When Arduino don't receive "PONG" reply anymore, a MOSFET disconnect power supply from Raspberry PI. At the same time, a timer in Arduino will be triggered.

When this timer is over, the same MOSFET will turn on Raspberry PI.
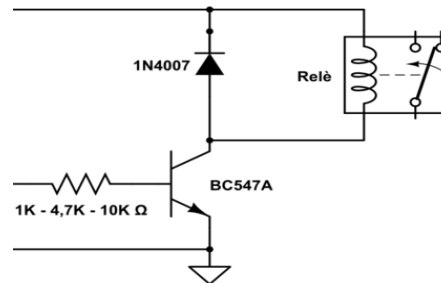
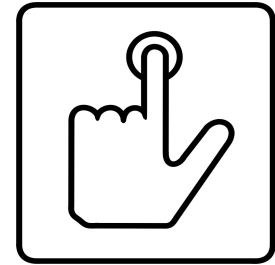A manual start push button is also included.

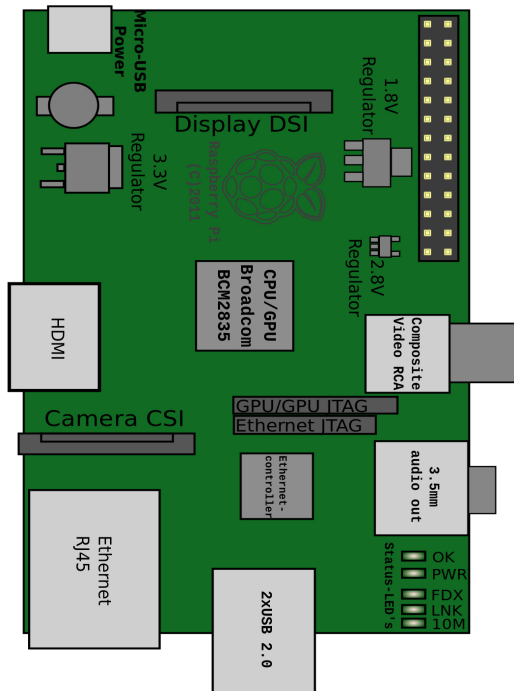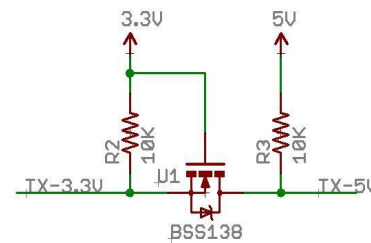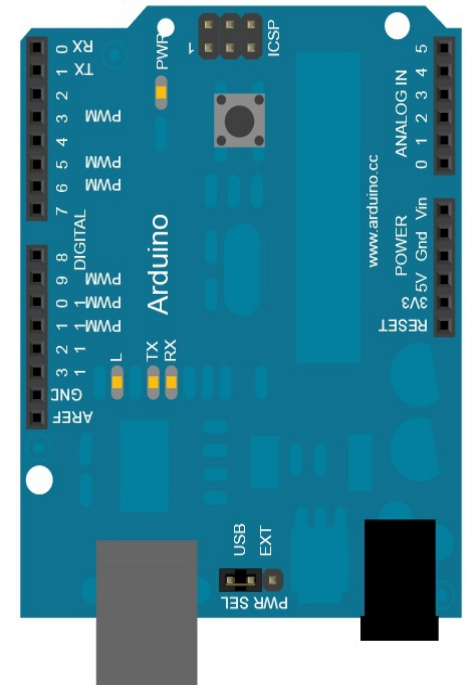# What we need?

Hardware elements

Power supply

Power on relay

Manual power on
push button

Raspberry PI

Level shifter between:
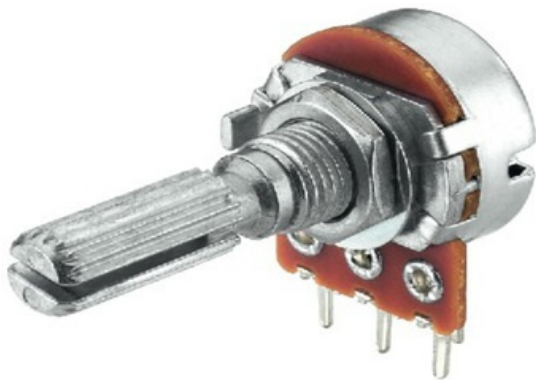-Raspberry PI GPIO
-Arduino PIN

Arduino

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Software elements

- Rarpberry PI side
  - Serial port "PING" replier
  - Auto-off scheduler

- Arduino side (firmware)
  - Manual power on push button management
  - RPI on/off MOSFET
  - Sleep time timer

Improvements

Hardware improvements

- A potenziometer to set the time off interval can be connected to an analog input of Arduino.

- A Real Time Clock for Raspberry GPIO to allow the correct sync (DS1307).

Software improvements

GUI and CLI programs for the Raspberry PI can be developed to manage all important parameters:
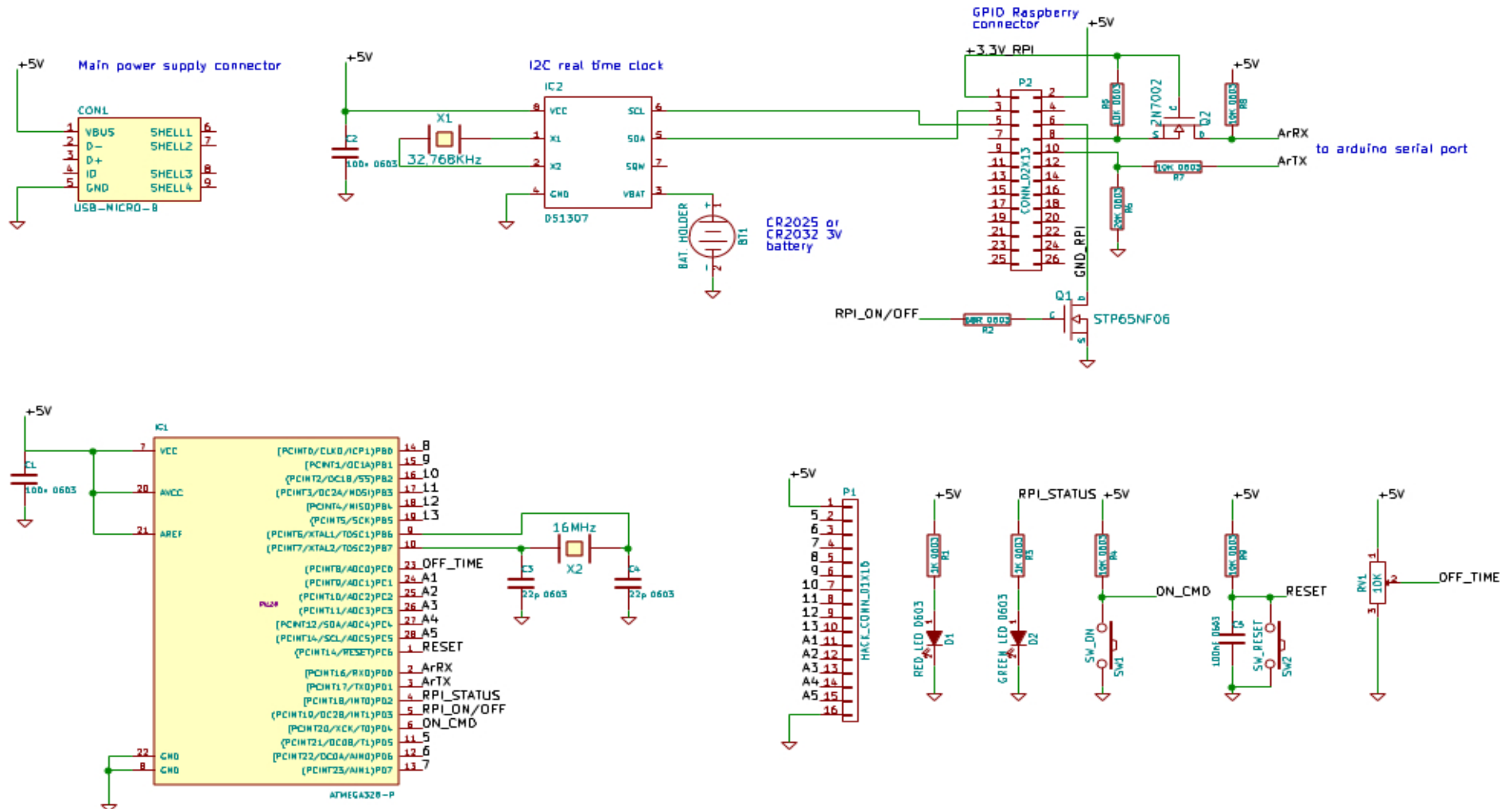
- Raspberry PI off time (atd daemon management).
- Arduino off time interval (a new off interval value can be transmitted by Raspberry PI to Arduino using the serial port).

Let' s hack it!

Arduino connected to Raspberry PI can do more of this. A lot of pins are still free and original firmware can be modified and improved so you can add other functions!

Schematic

Main power supply connector

I2C real time clock

GPIO Raspberry connector

to arduino serial port

CR2025 or CR2032 3V battery

RPI_ON/OFF STP65NF06

to be continued...

THE END

Thank you !

Vielen Dank !

Grazie mille !