YEPKiT

YKRUD2
Yepkit Raspi Up/Down Controller

## User Manual

Version 0.2

INDEX

PRODUCT OVERVIEW

SOFT SWITCH
YOUR RASPI

Yepkit RasPi Up/Down Controller

The Yepkit Raspi Up/Down Controller (YKRUD2) is a smart power switch, designed to be used with the Raspberry Pi board (from now onwards referred to as RasPi), that switches the Raspi ON/OFF just by pressing a push button. The power-off is performed safely first by halting and shutting down the operating system followed by the actual power cut-off.
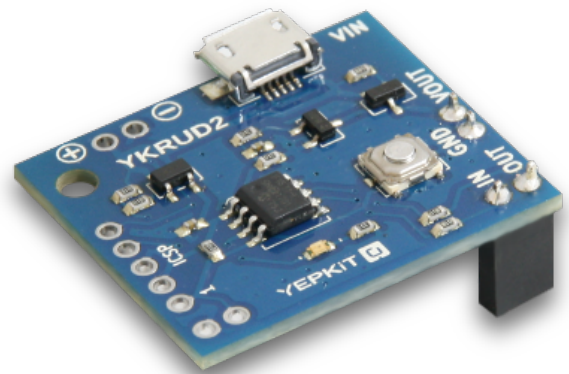
It's a compact board designed to be easily integrated together with the Raspi board.
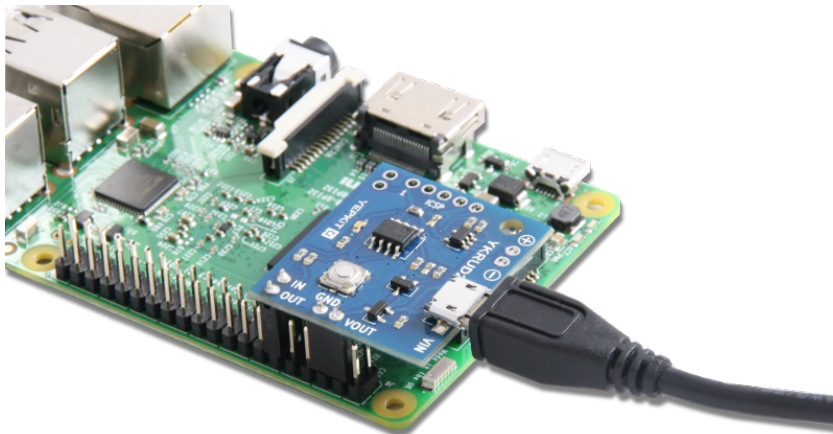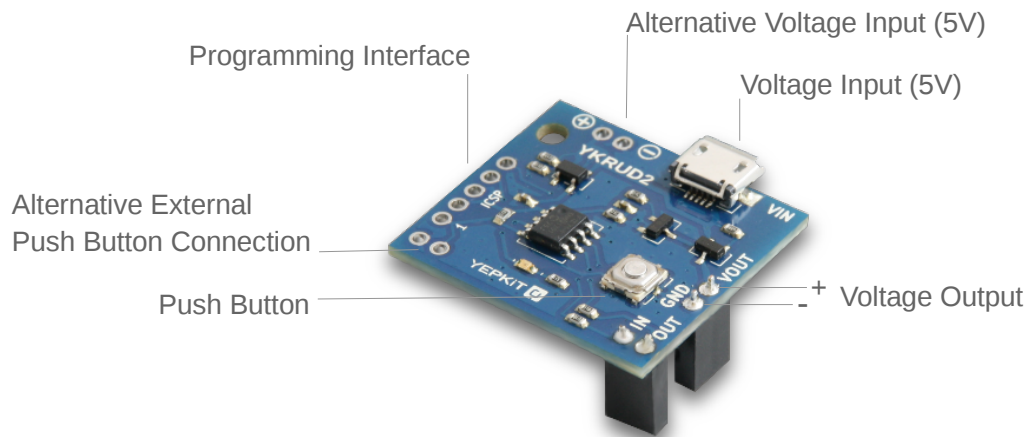
Main specifications:

- Up to 3.6A continuous current 5V power switch
- Micro USB female terminal for 5V power input
- In-board 3.3V Voltage Regulation for GPIO interface logic
- In-board microcontroller programmable through ICSP interface
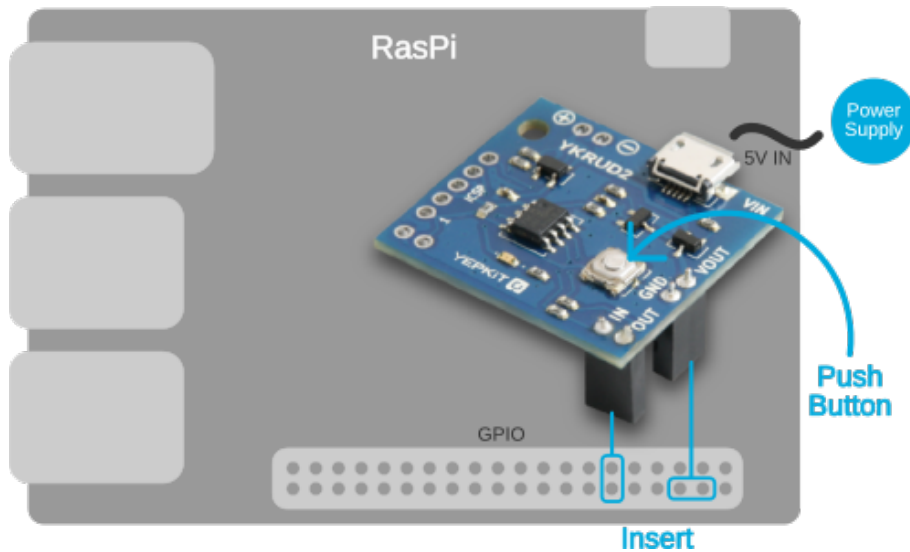- Open hardware
- Open software

PRODUCT OVERVIEW

Board diagram

Programming Interface

Alternative Voltage Input (5V)

Voltage Input (5V)

Alternative External
Push Button Connection

Push Button

Voltage Output

CONNECTING AND USING

LET'S SETUP

Start by connecting the YKRUD2 to the RasPi and powering it

Connecting the YKRUD2 to a RasPi is easy, just plug it by inserting the bottom side into the RasPi GPIO header as indicated in the illustration above. Please take care to connect exactly in the positions indicated.

Then power the YKRUD2 with a 5V power supply through the Micro USB terminal or the alternative power input pins. The use of a micro USB terminal was a design option to allow the user to use any power supply he might already be using to power the RasPi, which also uses a micro USB terminal for the 5V power input.

Install the YKRUD2 Linux scripts

In this section we assume that the provided YKRUD2 Linux script is used. This script is available for download at the YKRUD2 product page at yepkit.com.

YKRUD2 signals the Raspi to perform a certain action, but for the action to be undertaken by the RaspPi operating system must be continuously "listening". This is accomplished by a running process that is continuously monitoring the state of the GPIO that is connected to the OUT pin of the YKRUD2 board.

The provided script in Yepkit website already implements all the logic flow and signalling protocol and should be run at the end of the boot process of the RasPi operating system.

CONNECTING AND USING

This can be accomplished by adding the following entry to the /etc/rc.local file.

```
bash /home/user_name/bin/ykrud2.sh &
```

In the example above we assume that ykrud2.sh bash script is in /home/user_name/bin/ folder. Alter this to reflect the location of the ykrud2.sh file in your system.

At this point we have the ykrud2.sh script installed and configured in the user system. But for the communication with the YKRUD2 board to work, the RasPi GPIOs used to connect to the YKRUD2 board need to be properly configured.

In our example, which is reflected in the code available for download at our website, the following RasPi GPIOs are used:
- GPIO 17 – used for output (connects to the IN YKRUD2 terminal)
- GPIO 18 – used for input (connects to the OUT YKRUD2 terminal)

The configuration of these GPIOs can be performed by the following script, that we named gpio_setup.sh.

```
#!/bin/sh

#GPIO17 will be the YKRUD2 IN
sudo echo "17" > /sys/class/gpio/export
sudo echo "out" > /sys/class/gpio/gpio23/direction

#GPIO18 will be the YKRUD2 OUT
sudo echo "18" > /sys/class/gpio/export
sudo echo "in" > /sys/class/gpio/gpio22/direction

#Tell YKRUD2 raspi is OFF
sudo echo "0" > /sys/class/gpio/gpio17/value
```

This script should be executed at start-up and before the ykrud2.sh script. To ensure this, add the following entry to the /etc/rc.local file, before the entry that calls the ykrud2.sh script.

```
bash /home/user_name/bin/gpio_setup.sh
```

To complete the configuration just reboot the Raspi operating system.

At this point we recommend you to: 1) manually shut-down the Raspi operating system; 2) physically disconnect the power from the YKRUD2 board; 3) physically reconnect the power to YKRUD2 board. This will ensure a full reset to the system.

Now everything should work. Go ahead and test it by pressing the push button to power up the RasPi.
Once the RasPi has booted completely, press the YKRUD2 push button again to perform a soft-shutdown.

APPLICATION NOTES

PLAY AROUND WITH YKRUD2

Developing your own Firmware

You are free to hack YKRUD2 and alter it at wish. Nonetheless that will most likely imply a firmware alteration requiring the reprogramming of the inboard microcontroller.

To facilitate the reprogramming of the in board microcontroller, we made available in the board the Microchip ICSP programming interface pins for the PIC12F1571 microcontroller.

Due to this microcontroller program memory size it was not possible to use a bootloader, which would facilitate the hacking even more. Thus a programmer that supports the PIC12F1571 chip must be used to program a new firmware into it.

For details on programming the microcontroller using the ICSP refer to the PIC12F1571 datasheet that can be obtained from Microchip website or from the YKRUD2 product page in our website.

TROUBLESHOOTING

SOLVING PROBLEMS

YKRUD2 does not power up?

Check if the board is connected to a working power supply and that the 5 V are actually being supplied to the YKRUD2 power input. If it is, then physically disconnect the power input to the YKRUD2 board and then physically reconnect the power to YKRUD2 board.

YKRUD2 push-button is pressed but nothing happens?

Check all connections to verify that the hardware is properly connected. If it is, most likely is a configuration problem.

In this case check:
- The /etc/rc.local file and validate that the GPIO's are being configured at start-up and the ykrud2.sh script in being executed.
- That the scripts being called by /ect/rc.local are in the correct path.
- That the the physical connections between the YKRUD GND/IN/OUT pins and the Raspberry Pi board GPIO's are properly connected and according to the configuration in the gpio_setup.sh script.

If further assistance is required contact us through the contacts made available at www.yepkit.com.