



YKRUD Yepkit Raspi Up/Down Controller

User Manual

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PRODUCT OVERVIEW

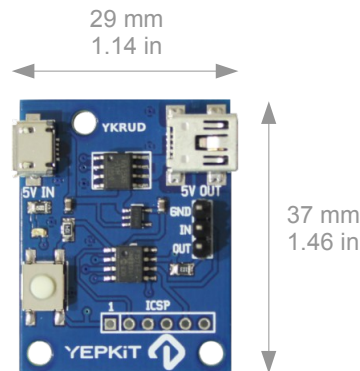
CONTROL YOUR RASPI

Yepkit Raspi Up/Down Controller

The Yepkit Raspi Up/Down Controller (YKRUD) 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 into project cases together with the Raspi board.



Other specifications:

- Up to 2A continuous current 5V power switch
- Micro USB female terminal for 5V power input
- In-board 3V LDO for GPIO interface logic
- In-board microcontroller programmable through ICSP terminals
- Open hardware board

CONNECTING AND USING

LET'S USE IT

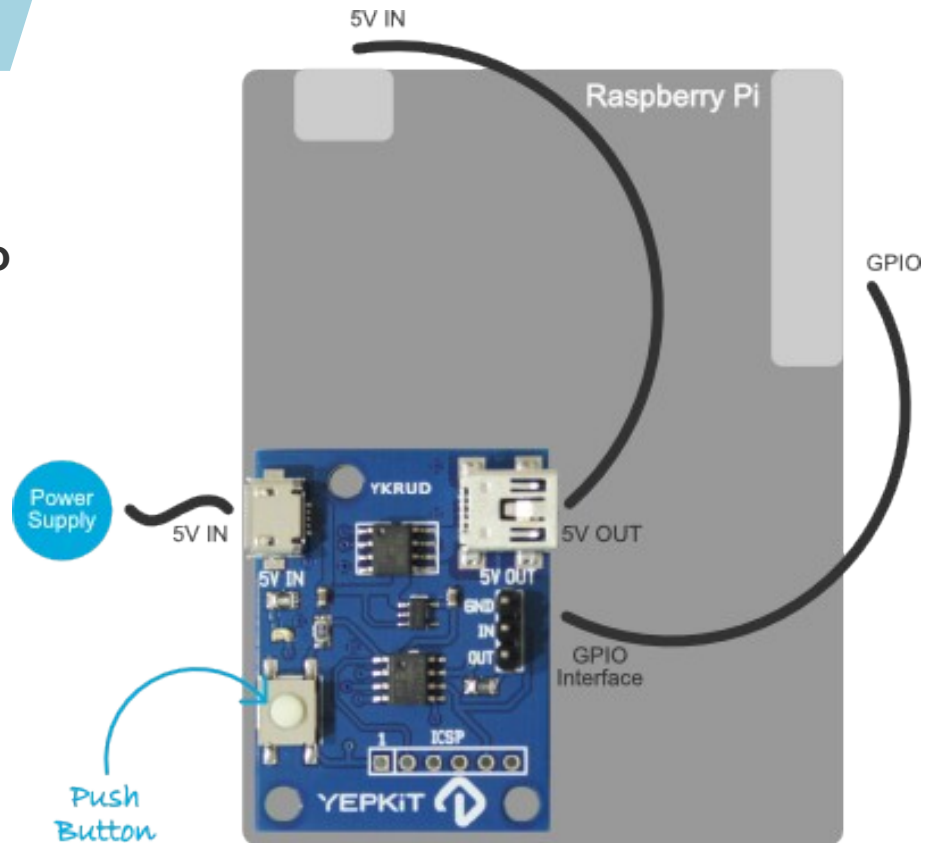
Connecting the YKRUD to the Raspi

Let's start by connecting YKRUD to Raspi.

First connect the YKRUD 5V OUT port (mini USB port) to the Raspi 5V power input.

The next step is to connect a 5V power supply to the YKRUD 5V IN terminal (YKRUD micro USB port).

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.



Installing the YKRUD Linux Script

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

YKRUD signals the Raspi to perform a certain action, but for the action to be undertaken by the Raspi 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 OUT pin of the YKRUD board.

The provided script in our 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/ykrud.sh &
```

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

At this point we have the `ykrud.sh` script installed and configured in the user system. But for the communication with the YKRUD board to work, the Raspi GPIO's used to connect to the YKRUD board need to be properly configured.

In our example, which is reflected in the code available for download at our website, the following Raspi GPIO's are used:

- GPIO 23 – used for output (connects to the IN YKRUD terminal)
- GPIO 22 – used for input (connects to the OUT YKRUD terminal)

The configuration of these GPIO's can be performed by the following script, that we named `gpio_setup.sh`.

```
#!/bin/sh  
  
#GPIO23 will be the YKRUD IN  
sudo echo "23" > /sys/class/gpio/export  
sudo echo "out" > /sys/class/gpio/gpio23/direction  
  
#GPIO22 will be the YKRUD OUT  
sudo echo "22" > /sys/class/gpio/export  
sudo echo "in" > /sys/class/gpio/gpio22/direction  
  
#Tell YKRUD raspi is OFF  
sudo echo "0" > /sys/class/gpio/gpio23/value
```

This script should be executed at start-up and before the `ykrud.sh` script. To ensure this, add the following entry to the `/etc/rc.local` file, before the entry that calls the `ykrud.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 YKRUD board; 3) physically reconnect the power to YKRUD board. This will ensure a full reset to the system.

At this point everything should be working normally.

APPLICATION NOTES

PLAY AROUND WITH YKRUD

Through this document we described YKRUD and how to use it. But this was all assuming the use of the provided software/scripts “out of the box”.

If you want to alter, expand or develop your own interfaces to YKRUD, some more information may be useful.

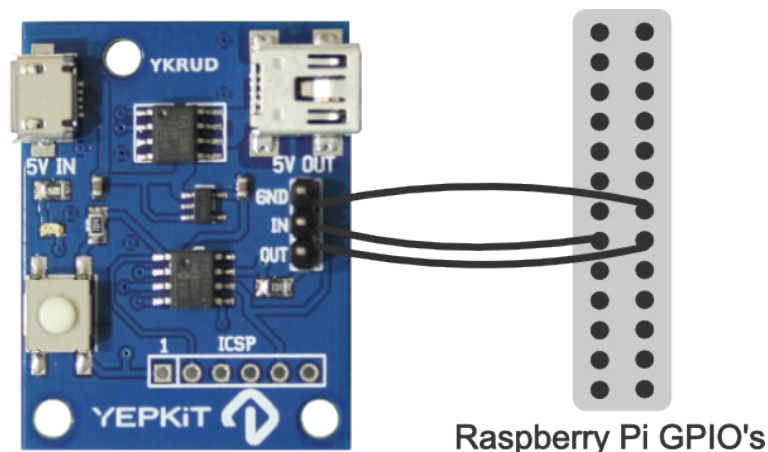
We provide all the incentive to the community to “play around” with our products, hack it, use it in new and innovative applications making it bigger in scope that we originally thought of.

To facilitate this we explore in this section some aspects that may be relevant for developing other applications.

YKRUD Logic Interfaces

YKRUD board has two logic interfaces, one configured as input and the other as output.

They were designed to interface with the Raspberry Pi board GPIO's as shown bellow.



The YKRUD logic interfaces are 3V logic, as the Raspberry Pi GPIO's, and can be used with boards other than the Raspberry Pi as long as the electrical levels of the 3V logic are respected.

Also, if you want to use YKRUD with other boards care must be taken so that the logic flow implemented by the firmware is respected. If the other boards are Linux based the provided scripts can most likely be used without (or with minor) changes.

APPLICATION NOTES

Developing your own Firmware

You are free to hack YKRUD 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 YKRUD product page in our website.

TROUBLESHOOTING

SOLVING PROBLEMS

YKRUD 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 YKRUD power input. If it is, then physically disconnect the power input to the YKRUD board and then physically reconnect the power to YKRUD board.

YKRUD 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 `ykrud.sh` script is 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.



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Find more at www.yepkit.com