rpi-backlight

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CHAPTER 1

Contents

1.1 Introduction

When I bought the official Raspberry Pi 7" touch LCD, I was quite happy about it - with one exception: *you can't change the display brightness in a simple way out of the box*.

I did some research and hacked some Python code together. Time passed by, and the whole project turned into a Python module: `rpi-backlight`.

Currently it has the following features:

- Change the display brightness **smoothly** or **abrupt**
- Set the display power on or off
- Get the current brightness
- Get the maximum brightness
- Get the display power state (on/off)
- Command line interface
- Graphical user interface

Now you are able to easily set the brightness of your display from the command line, a GUI and even Python code!

1.2 Installation

This section covers the installation of the library on the Raspberry Pi.

1.2.1 Requirements

- A **Raspberry Pi** including a correctly assembled **7" touch display v1.1 or higher** (look on the display's circuit board to see its version) running a Linux-based OS. Alternatively you can use rpi-backlight-emulator on all operating systems and without the actual hardware.
- Python 3.6+
- Optional: `pygobject` for the GUI, already installed on a recent Raspbian

1.2.2 Installation

Note: This library will **not** work with Windows IoT, you'll need a Linux distribution running on your Raspberry Pi. This was tested with Raspbian 9 (Stretch) and 10 (Buster).

rpi-backlight is available on PyPI, so you can install it using `pip3`:

```
$ pip3 install rpi_backlight
```

Note: Create this udev rule to update permissions, otherwise you'll have to run Python code, the GUI and CLI as root when *changing* the power or brightness:

```
$ echo 'SUBSYSTEM=="backlight",RUN+="/bin/chmod 666 /sys/class/backlight/%k/
↪brightness /sys/class/backlight/%k/bl_power"' | sudo tee -a /etc/udev/rules.d/
↪backlight-permissions.rules
```

rpi-backlight is now installed. See *Usage* to get started!

1.3 Usage

1.3.1 Python API

Make sure you've *installed* the library correctly.

Open a Python shell and import the `Backlight` class:

```
>>> from rpi_backlight import Backlight
```

Create an instance:

```
>>> backlight = Backlight()
```

Now you can get and set the display power and brightness:

```
>>> backlight.brightness
100
>>> backlight.brightness = 50
>>> backlight.brightness
50
>>>
>>> with backlight.fade(duration=1):
...     backlight.brightness = 0
```

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```
...
>>> backlight.fade_duration = 0.5
>>> # subsequent `backlight.brightness = x` will fade 500ms
>>>
>>> backlight.power
True
>>> backlight.power = False
>>> backlight.power
False
>>>
```

To use with ASUS Tinker Board:

```
>>> from rpi_backlight import Backlight, BoardType
>>>
>>> backlight = Backlight(board_type=BoardType.TINKER_BOARD)
>>> # continue like above
```

See the *API reference* for more details.

1.3.2 Command line interface

Open a terminal and run `rpi-backlight`.

```
$ rpi-backlight -b 100
$ rpi-backlight --set-brightness 20 --duration 1.5
$ rpi-backlight --get-brightness
20
$ rpi-backlight --get-power
on
$ rpi-backlight -p off
$ rpi-backlight --get-power
off
$ rpi-backlight --set-power off :emulator:
$
```

To use with ASUS Tinker Board:

```
$ rpi-backlight --board-type tinker-board ...
```

You can set the backlight sysfs path using a positional argument, set it to *:emulator:* to use with *rpi-backlight-emulator*.

Available options:

```
usage: rpi-backlight [-h] [--get-brightness] [-b VALUE] [--get-power]
                     [-p VALUE] [-d DURATION] [-B {raspberry-pi,tinker-board}]
                     [-V]
                     [SYSFS_PATH]

Get/set power and brightness of the official Raspberry Pi 7" touch display.

positional arguments:
SYSFS_PATH            Optional path to the backlight sysfs, set to
                        :emulator: to use with rpi-backlight-emulator
```

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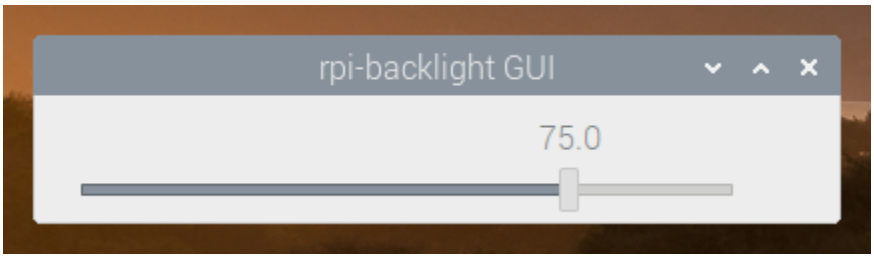
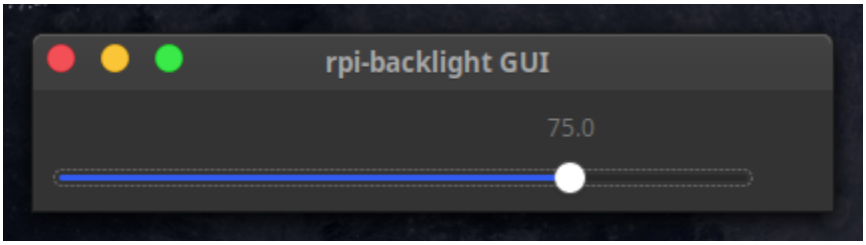
```
optional arguments:
-h, --help            show this help message and exit
--get-brightness      get the display brightness (0-100)
-b VALUE, --set-brightness VALUE
                        set the display brightness (0-100)
--get-power           get the display power (on/off)
-p VALUE, --set-power VALUE
                        set the display power (on/off/toggle)
-d DURATION, --duration DURATION
                        fading duration in seconds
-B {raspberry-pi,tinker-board}, --board-type {raspberry-pi,tinker-board}
                        board type
-V, --version         show program's version number and exit
```

1.3.3 Graphical user interface

Open a terminal and run `rpi-backlight-gui`.





Adding a shortcut to the LXDE panel

First, create a `.desktop` file for rpi-backlight (e.g. `/home/pi/.local/share/applications/rpi-backlight.desktop`) with the following content:

```
[Desktop Entry]
Version=1.0
Type=Application
Terminal=false
Name=rpi-backlight GUI
Exec=/home/pi/.local/bin/rpi-backlight-gui
Icon=/usr/share/icons/HighContrast/256x256/status/display-brightness.png
Categories=Utility;
```

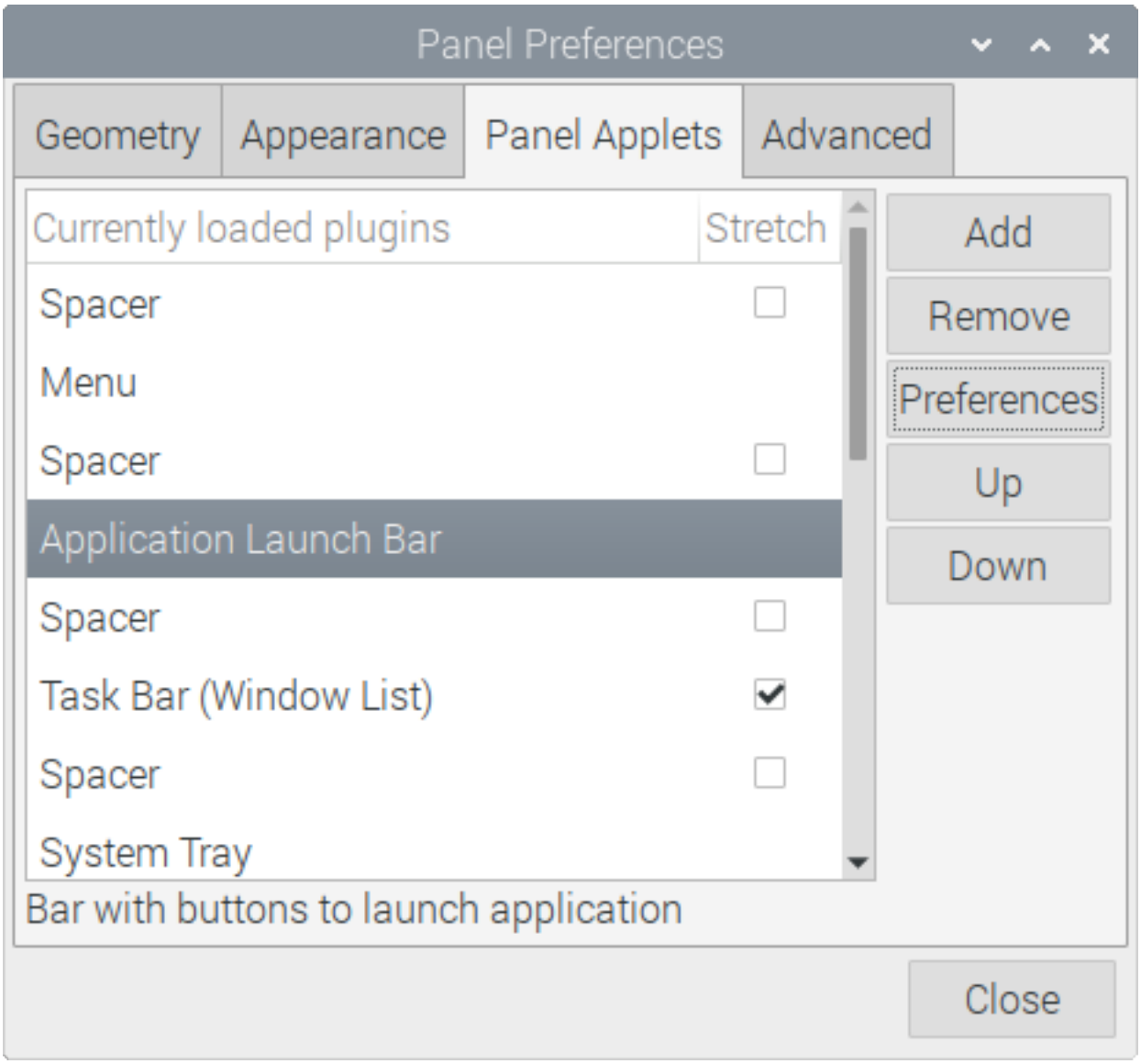
The absolute path to `rpi-backlight-gui` *might differ if you did not follow the installation instructions exactly, e.g. installed as root.*

Make it executable:

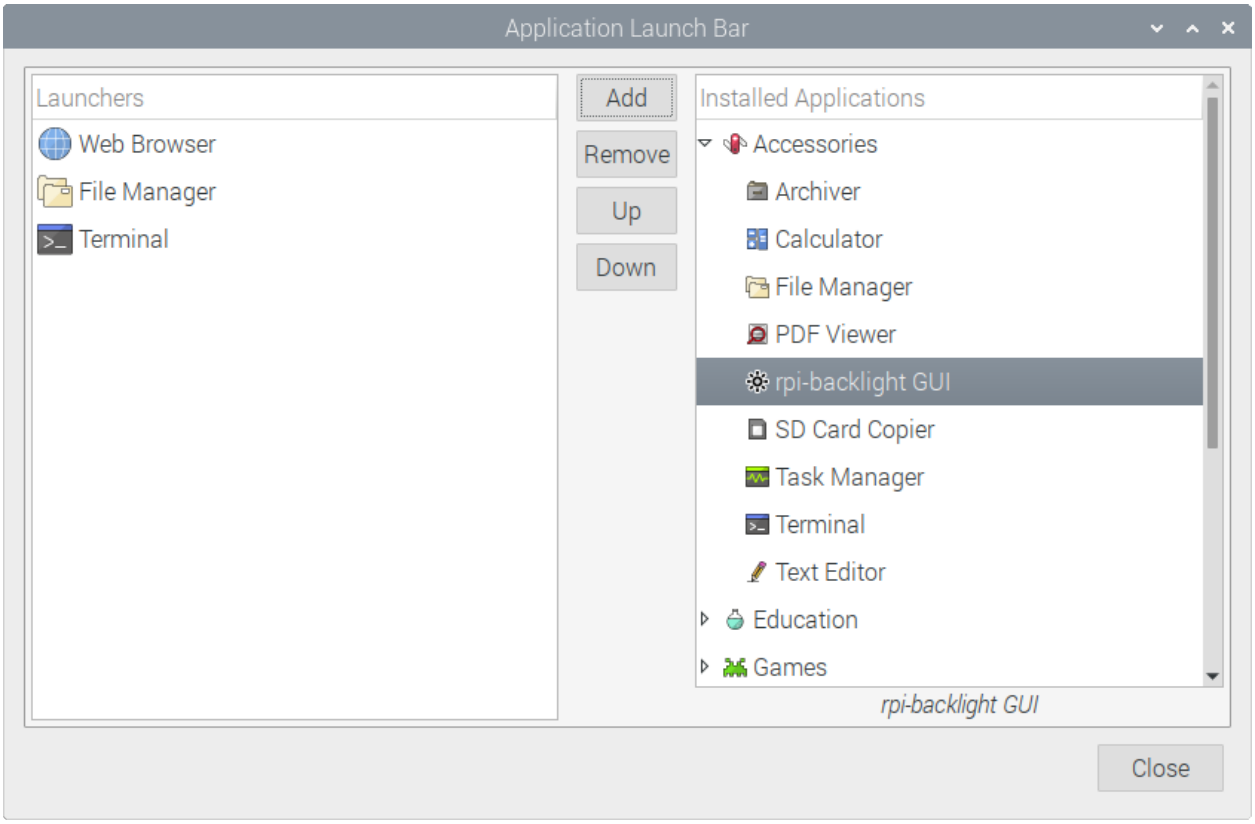
```
$ chmod +x /home/pi/.local/share/applications/rpi-backlight.desktop
```

You should now be able to start the rpi-backlight GUI from the menu: `(Raspberry Pi Logo)` → `Accessoires` → `rpi-backlight GUI`.

Next, right-click on the panel and choose `Add / Remove panel items`. Select `Application Launch Bar` and click `Preferences`:



Select `rpi-backlight GUI` on the right and click `Add`:



You're done!

1.4 API reference

class rpi_backlight.**Backlight**(*backlight_sysfs_path: Union[str, PathLike[str], None] = None, board_type: rpi_backlight.BoardType = <BoardType.RASPBERRY_PI: 1>*)

Main class to access and control the display backlight power and brightness.

Set `backlight_sysfs_path` to `":emulator:"` to use with rpi-backlight-emulator.

brightness

The display brightness in range 0-100.

```
>>> backlight = Backlight()
>>> backlight.brightness  # Display is at 50% brightness
50
>>> backlight.brightness = 100  # Set to full brightness
```

Getter Return the display brightness.

Setter Set the display brightness.

Type float

fade(*duration: float*) → Generator[T_co, T_contra, V_co]

Context manager for temporarily changing the fade duration.

```
>>> backlight = Backlight()
>>> with backlight.fade(duration=0.5):
...     backlight.brightness = 1  # Fade to 100% brightness for 0.5s
...
>>> with backlight.fade(duration=0):
...     backlight.brightness = 0  # Set to 0% brightness without fading, use␣
↪if you have set `backlight.fade_duration` > 0
```

fade_duration

The brightness fade duration in seconds, defaults to 0. Also see *fade()*.

```
>>> backlight = Backlight()
>>> backlight.fade_duration  # Fading is disabled by default
0
>>> backlight.fade_duration = 0.5  # Set to 500ms
```

Getter Return the fade duration.

Setter Set the fade duration.

Type float

power

Turn the display on and off.

```
>>> backlight = Backlight()
>>> backlight.power  # Display is on
True
>>> backlight.power = False  # Turn display off
```

Getter Return whether the display is powered on or off.

Setter Set the display power on or off.

Type bool

class rpi_backlight.**BoardType**

Enum to specify a board type in the *Backlight* constructor.

MICROSOFT_SURFACE_RT = 4

Microsoft Surface RT

RASPBERRY_PI = 1

Raspberry Pi

TINKER_BOARD = 2

Tinker Board

TINKER_BOARD_2 = 3

Tinker Board 2

rpi_backlight.cli.**main**()

Start the command line interface.

rpi_backlight.gui.**main**()

Start the graphical user interface.

rpi_backlight.utils.**detect_board_type**() → Optional[BoardType]

Try to detect the board type based on the model string in `/proc/device-tree/model`.

class rpi_backlight.utils.**FakeBacklightSysfs**

Context manager to create a temporary "fake sysfs" containing all relevant files. Used for tests and emulation.

```
>>> with FakeBacklightSysfs() as backlight_sysfs:
...     backlight = Backlight(backlight_sysfs_path=backlight_sysfs.path)
...     # use `backlight` as usual
```

1.5 Changes

1.5.1 2.6.0

- Add Python 3.11 as supported version, drop 3.6
- Add support for Microsoft Surface RT (#54, @apandada1)

1.5.2 2.5.0

- Add Python 3.10 as supported version
- Support alternate backlight sysfs path (#50, @j-coopz)

1.5.3 2.4.1

- Fix board type detection

1.5.4 2.4.0

- Drop support for Python 3.5, which reached end-of-life in late 2020. Supported versions as of this release are 3.6 - 3.9
- Implement automatic board type detection (#32, @p1r473), passing a `board_type` to the constructor is no longer necessary in most cases, even when using an ASUS Tinker Board
- Fix setting brightness to max value and brightness fading loop condition (#35, @Martin-HiPi)

1.5.5 2.3.0

- Add support for ASUS Tinker Board 2 (#29, @p1r473)

1.5.6 2.2.0

- Add toggle functionality to CLI (#21, @p1r473)
- Replace Travis CI with GitHub actions (#20, @linusg)
- Improve tests

1.5.7 2.1.0

- Add support for ASUS Tinker Board (#19, @p1r473)

1.5.8 2.0.1

- Add mypy type checking
- Add Python 3.8 to Travis CI config
- Fix documentation readthedocs build
- Fix typo in docs
- Improve README.md
- Mark project as stable on PyPI

1.5.9 2.0.0

- New, more pythonic API
- Update CLI and GUI
- Support emulator
- Add tests

1.5.10 1.8.1

- Fix float division issue with Python 2

1.5.11 1.8.0

- Fix permission error inconsistency across Python versions
- Update link to PyPI

1.5.12 1.7.1

- Fixed typo in `CHANGES.rst`
- Fixed rendering of parameters and return types in the documentation

1.5.13 1.7.0

- Fixed bug in `get_power`, which would eventually always return False
- Added parameters and return types in docstrings

1.5.14 1.6.0

- Added `duration` parameter to `set_brightness`
- `smooth` now defaults to `False`
- Huge improvements on CLI
- Fixed renamed function in examples

- Minor code and readme improvements

1.5.15 1.5.0

- PR #3 by Scouttp: Fixed permission errors
- Added documentation
- Code improvements
- Fixed typos

1.5.16 1.4.0

- Check for `pygobject` being installed
- Code cleanup
- README improvements
  - Added external links
  - Added badges
  - Fixed typos
- Moved to Travis CI and Landscape.io for builds and code health testing
- Prepared docs hosting at readthedocs.org

1.5.17 1.3.1

- Fixed type conversion

1.5.18 1.3.0

- Added experimental GUI (start with `rpi-backlight-gui`)

1.5.19 1.2.1

- Fixed CLI and typo

1.5.20 1.2.0

- Added command line interface (`rpi-backlight` and `rpi-backlight-gui`)
- Code improvements - thanks to deets

1.5.21 1.1.0

- Fixed `set_power(on)` function
- Added function to get the current power state of the LCD
- Added docstrings
- Code cleanup and improvements

1.5.22 1.0.0

Initial release. Added necessary files and basic features:

- Change the display brightness smoothly or abrupt
- Set the display power on or off
- Get the current brightness
- Get the maximum brightness

1.6 License

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```
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```

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