rfrht / **FT991A-PAT**

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<> Code   ⊙ Issues **1**   ⁐ Pull requests   ▶ Actions   📖 **Wiki**   ⊘ Security   ⩘ Ins

appendix rtl sdr gpio

Jump to bottom

Rodrigo Freire edited this page on 5 Oct · 10 revisions

Appendix 2 - Using RTL-SDR GPIO

Foreword - Some GPIO quirks

- After some investigation, I've found that the Header 30 (`GPIO 4`) is turned **ON** by default (in biased state, +3.3V), as soon you plug in the USB dongle. It is by hardware design, not related to software or drivers. While you can flip its state normally using the tools, keep in mind that this line specifically is **on** by default. This can be desirable in some designs.

- Headers 29, 31 and 32 (GPIOs 5, 2 and 1, respectively) might provide a vestigial 100 mV tension in its initial state (i.e. upon plug in and power-up) - click the link for the video - and this can be enough to signal "on" in some implementations. In order to drop the line to 0V, either use a pull-down resistor or just bias the GPIO line to `0` - By biasing the GPIO line to `0` drops the voltage to 0V.

- The **ON/UP** state in the GPIO lines signals +3.3V.

- Conversely, the **OFF/DOWN** state presents 0V.

- The RTL2832U GPIO lines are not protected against static discharge - If your project (or handling) involves external interfacing, ensure to provide proper ESD protection.

Changing GPIO states

In order to be able to use the RTL-SDR's GPIO ports, you will need the `rtl_biast` tool from this special RTL-SDR Blog build.

While in RTL-SDR you have the markings 29, 30, 31 and 32, these **does not correspond** to the actual GPIO number.

RTL-SDR GPIO header

Use the following table to translate the board numbers to the actual GPIO number:

SDR PIN	GPIO NR
29	5
30	4
31	2
32	1

RTL-SDR board GPIO and Software GPIO mapping

After installing the required (if your Windows doesn't have it) Windows C++ runtimes, use the `rtl_biast.exe` file to flip the GPIO signal of interest.
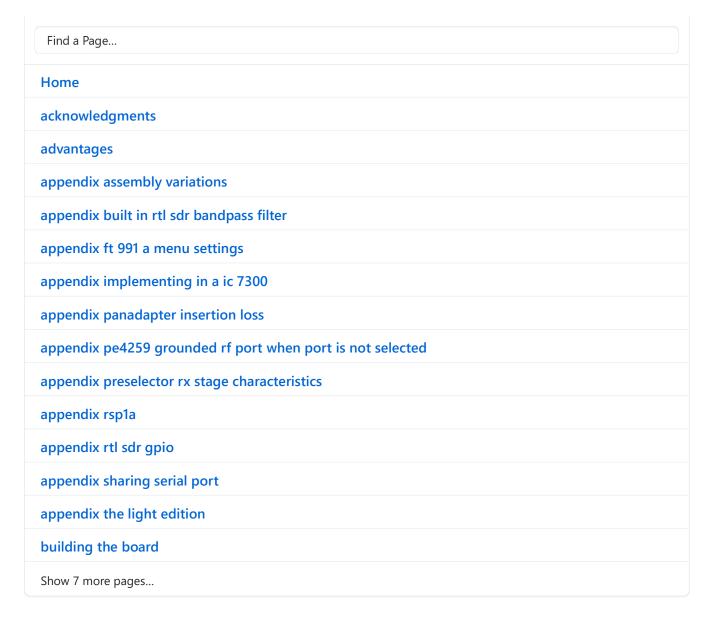
For example, flipping the GPIO Pin 31 to `ON` :

```
> rtl_biast -d 0 -b 1 -g 2
```

The above command translates to:

- `-d 0` - RTL-SDR Board #0 (use the proper number if you have more than one dongles)
- `-b 1` - Enable signal. Conversely, to turn the signal off use `-b 0`
- `-g 2` - GPIO #2, translated from SDR Header 31 from aforementioned table

Currently, there are no software provisions to find out the current bias state of each GPIO port. There's a pull request for showing the Bias Tee current state - But nothing involving the individual GPIO ports.

▼ Pages 22

Find a Page...

Home

acknowledgments

advantages

appendix assembly variations

appendix built in rtl sdr bandpass filter

appendix ft 991 a menu settings

appendix implementing in a ic 7300

appendix panadapter insertion loss

appendix pe4259 grounded rf port when port is not selected

appendix preselector rx stage characteristics

appendix rsp1a

appendix rtl sdr gpio

appendix sharing serial port

appendix the light edition

building the board

Show 7 more pages...

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```
https://github.com/rfrht/FT991A-PAT.wiki.git
```