

GPIO

The old sysfs GPIO interface is deprecated and will be phased out of the kernel. As part of this the base offset of GPIO ports has been omitted in the kernel. Setting the base GPIO number to zero will result in a boot up error on kernels from 6.6. At the same time, the sysfs interface to the GPIOs has been deprecated - some distributions have already disabled it and are expecting users to go through libgpiod. In 6.6, high-numbered GPIOs - probably still available by sysfs, but eventually that will be switched off.

Query GPIO ports

From 6.5 onwards, the Pi kernel is not forcing a base GPIO for the main GPIO driver. Whilst the sysfs API is still enabled, the base GPIOs will change. The dynamic assignment generally starts at 512 and counts down. If you really need to track down a GPIO using sysfs, look through `/sys/class/gpiochipN/` for a device with an appropriate label or `ngpio`, and then use `base` to determine the GPIO number.

```
cat /sys/kernel/debug/gpio
-----
gpiochip0: GPIOs 512-565, parent: platform/3f200000.gpio, pinctrl-bcm2835:
gpio-512 (ID_SDA           )
gpio-513 (ID_SCL           )
gpio-514 (GPIO02          )
gpio-515 (GPIO03          )
gpio-516 (GPIO04          )
gpio-517 (GPIO05          |sysfs           ) in hi
gpio-518 (GPIO06          )
gpio-519 (GPIO07          )
gpio-520 (GPIO08          )
gpio-521 (GPIO09          )
gpio-522 (GPIO10         )
gpio-523 (GPIO11         )
gpio-524 (GPIO12         )
gpio-525 (GPIO13         )
gpio-526 (GPIO14         )
gpio-527 (GPIO15         )
gpio-528 (GPIO16         )
gpio-529 (GPIO17         )
gpio-530 (GPIO18         )
gpio-531 (GPIO19         )
gpio-532 (GPIO20         )
gpio-533 (GPIO21         )
gpio-534 (GPIO22         )
gpio-535 (GPIO23         )
gpio-536 (GPIO24         )
gpio-537 (GPIO25         )
gpio-538 (GPIO26         )
gpio-539 (GPIO27         )
```

```
gpio-540 (SDA0 )
gpio-541 (SCL0 )
gpio-542 (NC )
gpio-543 (LAN_RUN )
gpio-544 (CAM_GPIO1 )
gpio-545 (NC )
gpio-546 (NC )
gpio-547 (PWR_LOW_N |PWR ) in lo
gpio-548 (NC )
gpio-549 (NC )
gpio-550 (USB_LIMIT )
gpio-551 (NC )
gpio-552 (PWM0_OUT )
gpio-553 (CAM_GPIO0 |cam1_regulator ) out lo
gpio-554 (SMPS_SCL )
gpio-555 (SMPS_SDA )
gpio-556 (ETH_CLK )
gpio-557 (PWM1_OUT )
gpio-558 (HDMI_HPD_N |hpd ) in hi ACTIVE LOW
gpio-559 (STATUS_LED |ACT ) out lo
gpio-560 (SD_CLK_R )
gpio-561 (SD_CMD_R )
gpio-562 (SD_DATA0_R )
gpio-563 (SD_DATA1_R )
gpio-564 (SD_DATA2_R )
gpio-565 (SD_DATA3_R )
```

gpiochip1: GPIOs 566-569, parent: usb/l-1.4:1.0, ftdi-cbus, can sleep:

GPIOD

You can install the libraries and tools to interact with this device, using `sudo apt install gpiod`. This will install the gpiod tools, and the libgpiod2 library to let you interact with the device from your own code.

```
# apt install gpiod --> runtime
# apt install libgpiod2 --> build libraries
```

```
# gpiodetect
-----
gpiochip0 [pinctrl-bcm2835] (54 lines)
gpiochip1 [ftdi-cbus] (4 lines)
```

```
# gpioinfo
-----
gpiochip0 - 54 lines:
  line 0: "ID_SDA" unused input active-high
  line 1: "ID_SCL" unused input active-high
```

```

line  2:      "GPIO2"      unused  input  active-high
line  3:      "GPIO3"      unused  input  active-high
line  4:      "GPIO4"      unused  input  active-high
line  5:      "GPIO5"      "sysfs" input  active-high [used]
line  6:      "GPIO6"      unused  input  active-high
line  7:      "GPIO7"      unused  input  active-high
line  8:      "GPIO8"      unused  input  active-high
line  9:      "GPIO9"      unused  input  active-high
line 10:      "GPIO10"     unused  input  active-high
line 11:      "GPIO11"     unused  input  active-high
line 12:      "GPIO12"     unused  input  active-high
line 13:      "GPIO13"     unused  input  active-high
line 14:      "GPIO14"     unused  input  active-high
line 15:      "GPIO15"     unused  input  active-high
line 16:      "GPIO16"     unused  input  active-high
line 17:      "GPIO17"     unused  input  active-high
line 18:      "GPIO18"     unused  input  active-high
line 19:      "GPIO19"     unused  input  active-high
line 20:      "GPIO20"     unused  input  active-high
line 21:      "GPIO21"     unused  input  active-high
line 22:      "GPIO22"     unused  input  active-high
line 23:      "GPIO23"     unused  input  active-high
line 24:      "GPIO24"     unused  input  active-high
line 25:      "GPIO25"     unused  input  active-high
line 26:      "GPIO26"     unused  input  active-high
line 27:      "GPIO27"     unused  input  active-high
line 28:      "SDA0"      unused  input  active-high
line 29:      "SCL0"      unused  input  active-high
line 30:      "NC"        unused  input  active-high
line 31:      "LAN_RUN"    unused  output active-high
line 32:      "CAM_GPIO1"  unused  output active-high
line 33:      "NC"        unused  input  active-high
line 34:      "NC"        unused  input  active-high
line 35:      "PWR_LOW_N"  "PWR"  input  active-high [used]
line 36:      "NC"        unused  input  active-high
line 37:      "NC"        unused  input  active-high
line 38:      "USB_LIMIT"  unused  output active-high
line 39:      "NC"        unused  input  active-high
line 40:      "PWM0_OUT"   unused  input  active-high
line 41:      "CAM_GPIO0"  "cam1_regulator" output active-high [used]
line 42:      "SMPS_SCL"   unused  output active-high
line 43:      "SMPS_SDA"   unused  input  active-high
line 44:      "ETH_CLK"    unused  input  active-high
line 45:      "PWM1_OUT"   unused  input  active-high
line 46:      "HDMI_HPD_N"  "hpd"  input  active-low [used]
line 47:      "STATUS_LED" "ACT"  output active-high [used]
line 48:      "SD_CLK_R"   unused  input  active-high
line 49:      "SD_CMD_R"    unused  input  active-high
line 50:      "SD_DATA0_R"  unused  input  active-high
line 51:      "SD_DATA1_R"  unused  input  active-high
line 52:      "SD_DATA2_R"  unused  input  active-high

```

```
line 53: "SD_DATA3_R"          unused  input  active-high
gpiochip1 - 4 lines:
line 0:      unnamed          kernel  input  active-high [used]
line 1:      unnamed          kernel  input  active-high [used]
line 2:      unnamed          kernel  input  active-high [used]
line 3:      unnamed          kernel  input  active-high [used]
```

Links

- <https://www.auctoris.co.uk/2023/08/18/how-not-to-use-sysfs-for-gpio-on-a-raspberry-pi-how-you-should-do-it-in-2023/>
- <https://openwrt.org/docs/techref/hardware/port.gpio>

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