Arduino Gyroscope Driver

Generated by Doxygen 1.8.9.1

Tue Aug 18 2015 22:52:30

Contents

1 Class Index 1

1.1 Class List . . . 1

2 File Index 1

2.1 File List . . . 1

3 Class Documentation 1

3.1 GpioRPi Class Reference . . . 2

3.1.1 Detailed Description . . . 2

3.1.2 Member Function Documentation . . . 2

3.1.3 Member Data Documentation . . . 3

4 File Documentation 3

4.1 Gpio.cpp File Reference . . . 3

4.1.1 Variable Documentation . . . 3

4.2 Gpio.cpp . . . 4

4.3 Gpio.h File Reference . . . 4

4.3.1 Macro Definition Documentation . . . 6

4.3.2 Variable Documentation . . . 8

4.4 Gpio.h . . . 8

Index 11

1 Class Index

1.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

GpioRPi 2

2 File Index

2.1 File List

Here is a list of all files with brief descriptions:

Gpio.cpp 3

Gpio.h 4

3 Class Documentation

3.1 GpioRPi Class Reference

`#include <Gpio.h>`

Public Member Functions

- void begin ()
- void stop ()
- void pinMode (unsigned char pin, bool mode)
- void digitalWrite (unsigned char pin, bool value)
- bool digitalRead (unsigned char pin)
- void setPin (unsigned char pin)
- void clearPin (unsigned char pin)

Private Member Functions

- void configureBits (volatile unsigned int *address, unsigned int value, unsigned int mask)
- unsigned int safeRead (volatile unsigned int *address)
- void safeWrite (volatile unsigned int *address, unsigned int value)

Private Attributes

- Bcm2835::Peripheral gpio

3.1.1 Detailed Description

Definition at line 59 of file Gpio.h.

3.1.2 Member Function Documentation

3.1.2.1 void GpioRPi::begin ( )

Definition at line 4 of file Gpio.cpp.

3.1.2.2 void GpioRPi::clearPin (unsigned char *pin*)

Definition at line 30 of file Gpio.cpp.

3.1.2.3 void GpioRPi::configureBits (volatile unsigned int * *address*, unsigned int *value*, unsigned int *mask*) [private]

Definition at line 42 of file Gpio.cpp.

3.1.2.4 bool GpioRPi::digitalRead (unsigned char *pin*)

Definition at line 19 of file Gpio.cpp.

3.1.2.5 void GpioRPi::digitalWrite (unsigned char *pin*, bool *value*)

Definition at line 13 of file Gpio.cpp.

3.1.2.6 void GpioRPi::pinMode (unsigned char *pin*, bool *mode*)

Definition at line 34 of file Gpio.cpp.

3.1.2.7 unsigned int GpioRPi::safeRead (volatile unsigned int * *address*) [private]

Definition at line 48 of file Gpio.cpp.

3.1.2.8 void GpioRPi::safeWrite (volatile unsigned int * *address*, unsigned int *value*) [private]

Definition at line 56 of file Gpio.cpp.

3.1.2.9 void GpioRPi::setPin (unsigned char *pin*)

Definition at line 26 of file Gpio.cpp.

3.1.2.10 void GpioRPi::stop ( )

Definition at line 9 of file Gpio.cpp.

3.1.3 Member Data Documentation

3.1.3.1 Bcm2835::Peripheral GpioRPi::gpio [private]

Definition at line 61 of file Gpio.h.

The documentation for this class was generated from the following files:

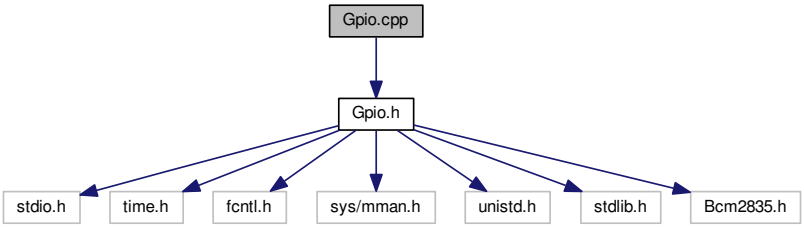
- Gpio.h
- Gpio.cpp

4 File Documentation

4.1 Gpio.cpp File Reference

```
#include "Gpio.h"
```

Include dependency graph for Gpio.cpp:



Variables

- GpioRPi Gpio

4.1.1 Variable Documentation

4.1.1.1 GpioRPi Gpio

Definition at line 63 of file Gpio.cpp.

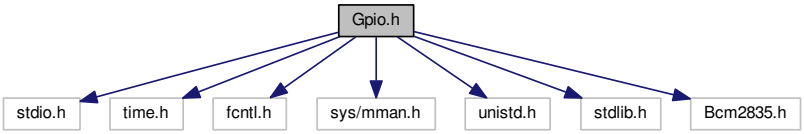
4.2 Gpio.cpp

```
00001
00002 #include "Gpio.h"
00003
00004 void GpioRPi::begin() {
00005     gpio.address = GPIO_ADDRESS;
00006     Bcm2835::mapPeripheral(&gpio);
00007 }
00008
00009 void GpioRPi::stop() {
00010     Bcm2835::unmapPeripheral(&gpio);
00011 }
00012
00013 void GpioRPi::digitalWrite(unsigned char pin, bool value) {
00014     volatile unsigned int* address = (unsigned int*)gpio.mem + ((value) ?
      BCM2835_GPSET0 : BCM2835_GPCLR0) / 4 + pin / 32;
00015     unsigned char shift = pin % 32;
00016     safeWrite(address, 0x000001 << shift);
00017 }
00018
00019 bool GpioRPi::digitalRead(unsigned char pin) {
00020     volatile unsigned int* address = (unsigned int*)gpio.mem +
      BCM2835_GPLEV0 / 4 + pin / 32;
00021     unsigned char shift = pin % 32;
00022     unsigned int v = safeRead(address);
00023     return (v & (1 << shift)) ? HIGH : LOW;
00024 }
00025
00026 void GpioRPi::setPin(unsigned char pin) {
00027     digitalWrite(pin, HIGH)
00028 }
00029
00030 void GpioRPi::clearPin(unsigned char pin) {
00031     digitalWrite(pin, LOW)
00032 }
00033
00034 void GpioRPi::pinMode(unsigned char pin, bool mode) {
00035     volatile unsigned int* address = (unsigned int*)gpio.mem +
      BCM2835_GPFSEL0 / 4 + (pin / 10);
00036     unsigned char shift = (pin % 10) * 3;
00037     unsigned int mask = BCM2835_FSEL_MASK << shift;
00038     unsigned int value = (mode) ? (0x000001 << shift) : 0x000000;
00039     configureBits(address, value, mask);
00040 }
00041
00042 void GpioRPi::configureBits(volatile unsigned int* address, unsigned int value,
      unsigned int mask) {
00043     unsigned int v = safeRead(address);
00044     v = (v & ~mask) | (value & mask);
00045     safeWrite(address, v);
00046 }
00047
00048 unsigned int GpioRPi::safeRead(volatile unsigned int* address) {
00049     unsigned int i = *address;
00050 #if USE_RW_BARRIER == 1
00051     unsigned int dummy = *address;
00052 #endif
00053     return i;
00054 }
00055
00056 void GpioRPi::safeWrite(volatile unsigned int* address, unsigned int value) {
00057 #if USE_RW_BARRIER == 1
00058     *address = value;
00059 #endif
00060     *address = value;
00061 }
00062
00063 GpioRPi Gpio;
```

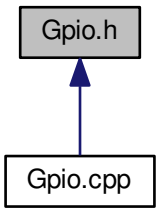
4.3 Gpio.h File Reference

```
#include <stdio.h>
#include <time.h>
#include <fcntl.h>
#include <sys/mman.h>
#include <unistd.h>
#include <stdlib.h>
#include <Bcm2835.h>
```

Include dependency graph for Gpio.h:



This graph shows which files directly or indirectly include this file:



Classes

- class GpioRPi

Macros

- #define GPIO_ADDRESS 0x200000
- #define INPUT 0
- #define OUTPUT 1
- #define LOW 0
- #define HIGH 1
- #define USE_RW_BARRIER 0
- #define BCM2835_FSEL_MASK 0x000007
- #define BCM2835_GPFSEL0 0x000000
- #define BCM2835_GPFSEL1 0x000004
- #define BCM2835_GPFSEL2 0x000008
- #define BCM2835_GPFSEL3 0x00000c
- #define BCM2835_GPFSEL4 0x000010
- #define BCM2835_GPFSEL5 0x000014
- #define BCM2835_GPSET0 0x00001c
- #define BCM2835_GPSET1 0x000020
- #define BCM2835_GPCLR0 0x000028
- #define BCM2835_GPCLR1 0x00002c
- #define BCM2835_GPLEV0 0x000034
- #define BCM2835_GPLEV1 0x000038
- #define BCM2835_GPEDS0 0x000040

- #define BCM2835_GPEDS1 0x000044
- #define BCM2835_GPREN0 0x00004c
- #define BCM2835_GPREN1 0x000050
- #define BCM2835_GPFEN0 0x000048
- #define BCM2835_GPFEN1 0x00005c
- #define BCM2835_GPHEN0 0x000064
- #define BCM2835_GPHEN1 0x000068
- #define BCM2835_GPLEN0 0x000070
- #define BCM2835_GPLEN1 0x000074
- #define BCM2835_GPAREN0 0x00007c
- #define BCM2835_GPAREN1 0x000080
- #define BCM2835_GPAFEN0 0x000088
- #define BCM2835_GPAFEN1 0x00008c
- #define BCM2835_GPPUD 0x000094
- #define BCM2835_GPPUDCLK0 0x000098
- #define BCM2835_GPPUDCLK1 0x00009c

Variables

- GpioRPi Gpio

4.3.1 Macro Definition Documentation

4.3.1.1 #define BCM2835_FSEL_MASK 0x000007

Definition at line 28 of file Gpio.h.

4.3.1.2 #define BCM2835_GPAFEN0 0x000088

Definition at line 53 of file Gpio.h.

4.3.1.3 #define BCM2835_GPAFEN1 0x00008c

Definition at line 54 of file Gpio.h.

4.3.1.4 #define BCM2835_GPAREN0 0x00007c

Definition at line 51 of file Gpio.h.

4.3.1.5 #define BCM2835_GPAREN1 0x000080

Definition at line 52 of file Gpio.h.

4.3.1.6 #define BCM2835_GPCLR0 0x000028

Definition at line 37 of file Gpio.h.

4.3.1.7 #define BCM2835_GPCLR1 0x00002c

Definition at line 38 of file Gpio.h.

4.3.1.8 #define BCM2835_GPEDS0 0x000040

Definition at line 41 of file Gpio.h.

4.3.1.9 #define BCM2835_GPEDS1 0x000044

Definition at line 42 of file Gpio.h.

4.3.1.10 #define BCM2835_GPFEN0 0x000048

Definition at line 45 of file Gpio.h.

4.3.1.11 #define BCM2835_GPFEN1 0x00005c

Definition at line 46 of file Gpio.h.

4.3.1.12 #define BCM2835_GPFSEL0 0x000000

Definition at line 29 of file Gpio.h.

4.3.1.13 #define BCM2835_GPFSEL1 0x000004

Definition at line 30 of file Gpio.h.

4.3.1.14 #define BCM2835_GPFSEL2 0x000008

Definition at line 31 of file Gpio.h.

4.3.1.15 #define BCM2835_GPFSEL3 0x00000c

Definition at line 32 of file Gpio.h.

4.3.1.16 #define BCM2835_GPFSEL4 0x000010

Definition at line 33 of file Gpio.h.

4.3.1.17 #define BCM2835_GPFSEL5 0x000014

Definition at line 34 of file Gpio.h.

4.3.1.18 #define BCM2835_GPHEN0 0x000064

Definition at line 47 of file Gpio.h.

4.3.1.19 #define BCM2835_GPHEN1 0x000068

Definition at line 48 of file Gpio.h.

4.3.1.20 #define BCM2835_GPLEN0 0x000070

Definition at line 49 of file Gpio.h.

4.3.1.21 #define BCM2835_GPLEN1 0x000074

Definition at line 50 of file Gpio.h.

4.3.1.22 #define BCM2835_GPLEV0 0x000034

Definition at line 39 of file Gpio.h.

4.3.1.23 #define BCM2835_GPLEV1 0x000038

Definition at line 40 of file Gpio.h.

4.3.1.24 #define BCM2835_GPPUD 0x000094

Definition at line 55 of file Gpio.h.

4.3.1.25 #define BCM2835_GPPUDCLK0 0x000098

Definition at line 56 of file Gpio.h.

4.3.1.26 #define BCM2835_GPPUDCLK1 0x00009c

Definition at line 57 of file Gpio.h.

4.3.1.27 #define BCM2835_GPREN0 0x00004c

Definition at line 43 of file Gpio.h.

4.3.1.28 #define BCM2835_GPREN1 0x000050

Definition at line 44 of file Gpio.h.

4.3.1.29 #define BCM2835_GPSET0 0x00001c

Definition at line 35 of file Gpio.h.

4.3.1.30 #define BCM2835_GPSET1 0x000020

Definition at line 36 of file Gpio.h.

4.3.1.31 #define GPIO_ADDRESS 0x200000

Definition at line 18 of file Gpio.h.

4.3.1.32 #define HIGH 1

Definition at line 23 of file Gpio.h.

4.3.1.33 #define INPUT 0

Definition at line 20 of file Gpio.h.

4.3.1.34 #define LOW 0

Definition at line 22 of file Gpio.h.

4.3.1.35 #define OUTPUT 1

Definition at line 21 of file Gpio.h.

4.3.1.36 #define USE_RW_BARRIER 0

Definition at line 25 of file Gpio.h.

4.3.2 Variable Documentation

4.3.2.1 GpioRPi Gpio

Definition at line 63 of file Gpio.cpp.

4.4 Gpio.h

```
00001
00006 #ifndef __RASPBERRY_GPIO_H__
00007 #define __RASPBERRY_GPIO_H__ 1
00008
00009 #include <stdio.h>
00010 #include <time.h>
```

```
00011 #include <fcntl.h>
00012 #include <sys/mman.h>
00013 #include <unistd.h>
00014 #include <stdlib.h>
00015
00016 #include <Bcm2835.h>
00017
00018 #define GPIO_ADDRESS                        0x200000
00019
00020 #define INPUT                               0
00021 #define OUTPUT                              1
00022 #define LOW                                 0
00023 #define HIGH                                1
00024
00025 #define USE_RW_BARRIER                      0
00026
00027 /* FSEL */
00028 #define BCM2835_FSEL_MASK                    0x000007 // Function select bits mask
00029 #define BCM2835_GPFSEL0                      0x000000 // GPIO Function Select 0
00030 #define BCM2835_GPFSEL1                      0x000004 // GPIO Function Select 1
00031 #define BCM2835_GPFSEL2                      0x000008 // GPIO Function Select 2
00032 #define BCM2835_GPFSEL3                      0x00000c // GPIO Function Select 3
00033 #define BCM2835_GPFSEL4                      0x000010 // GPIO Function Select 4
00034 #define BCM2835_GPFSEL5                      0x000014 // GPIO Function Select 5
00035 #define BCM2835_GPSET0                       0x00001c // GPIO Pin Output Set 0
00036 #define BCM2835_GPSET1                       0x000020 // GPIO Pin Output Set 1
00037 #define BCM2835_GPCLR0                       0x000028 // GPIO Pin Output Clear 0
00038 #define BCM2835_GPCLR1                       0x00002c // GPIO Pin Output Clear 1
00039 #define BCM2835_GPLEV0                       0x000034 // GPIO Pin Level 0
00040 #define BCM2835_GPLEV1                       0x000038 // GPIO Pin Level 1
00041 #define BCM2835_GPEDS0                       0x000040 // GPIO Pin Event Detect Status 0
00042 #define BCM2835_GPEDS1                       0x000044 // GPIO Pin Event Detect Status 1
00043 #define BCM2835_GPREN0                       0x00004c // GPIO Pin Rising Edge Detect Enable 0
00044 #define BCM2835_GPREN1                       0x000050 // GPIO Pin Rising Edge Detect Enable 1
00045 #define BCM2835_GPFEN0                       0x000048 // GPIO Pin Falling Edge Detect Enable 0
00046 #define BCM2835_GPFEN1                       0x00005c // GPIO Pin Falling Edge Detect Enable 1
00047 #define BCM2835_GPHEN0                       0x000064 // GPIO Pin High Detect Enable 0
00048 #define BCM2835_GPHEN1                       0x000068 // GPIO Pin High Detect Enable 1
00049 #define BCM2835_GPLEN0                       0x000070 // GPIO Pin Low Detect Enable 0
00050 #define BCM2835_GPLEN1                       0x000074 // GPIO Pin Low Detect Enable 1
00051 #define BCM2835_GPAREN0                      0x00007c // GPIO Pin Async. Rising Edge Detect 0
00052 #define BCM2835_GPAREN1                      0x000080 // GPIO Pin Async. Rising Edge Detect 1
00053 #define BCM2835_GPAFEN0                      0x000088 // GPIO Pin Async. Falling Edge Detect 0
00054 #define BCM2835_GPAFEN1                      0x00008c // GPIO Pin Async. Falling Edge Detect 1
00055 #define BCM2835_GPPUD                        0x000094 // GPIO Pin Pull-up/down Enable
00056 #define BCM2835_GPPUDCLK0                    0x000098 // GPIO Pin Pull-up/down Enable Clock 0
00057 #define BCM2835_GPPUDCLK1                    0x00009c // GPIO Pin Pull-up/down Enable Clock 1
00058
00059 class GpioRPi {
00060
00061     Bcm2835::Peripheral gpio;
00062
00063 public:
00064
00065     void begin();
00066
00067     void stop();
00068
00069     void pinMode(unsigned char pin, bool mode);
00070
00071     void digitalWrite(unsigned char pin, bool value);
00072
00073     bool digitalRead(unsigned char pin);
00074
00075     void setPin(unsigned char pin);
00076
00077     void clearPin(unsigned char pin);
00078
00079 private:
00080
00081     void configureBits(volatile unsigned int* address, unsigned int value, unsigned int mask);
00082
00083     unsigned int safeRead(volatile unsigned int* address);
00084
00085     void safeWrite(volatile unsigned int* address, unsigned int value);
00086 };
00087
00088 extern GpioRPi Gpio;
00089
00090 #endif /* __RASPBERRY_GPIO_H__ */
```

Index

BCM2835_FSEL_MASK
    Gpio.h, 6
BCM2835_GPAFEN0
    Gpio.h, 6
BCM2835_GPAFEN1
    Gpio.h, 6
BCM2835_GPAREN0
    Gpio.h, 6
BCM2835_GPAREN1
    Gpio.h, 6
BCM2835_GPCLR0
    Gpio.h, 6
BCM2835_GPCLR1
    Gpio.h, 6
BCM2835_GPEDS0
    Gpio.h, 6
BCM2835_GPEDS1
    Gpio.h, 6
BCM2835_GPFEN0
    Gpio.h, 6
BCM2835_GPFEN1
    Gpio.h, 7
BCM2835_GPFSEL0
    Gpio.h, 7
BCM2835_GPFSEL1
    Gpio.h, 7
BCM2835_GPFSEL2
    Gpio.h, 7
BCM2835_GPFSEL3
    Gpio.h, 7
BCM2835_GPFSEL4
    Gpio.h, 7
BCM2835_GPFSEL5
    Gpio.h, 7
BCM2835_GPHEN0
    Gpio.h, 7
BCM2835_GPHEN1
    Gpio.h, 7
BCM2835_GPLEN0
    Gpio.h, 7
BCM2835_GPLEN1
    Gpio.h, 7
BCM2835_GPLEV0
    Gpio.h, 7
BCM2835_GPLEV1
    Gpio.h, 7
BCM2835_GPPUD
    Gpio.h, 7
BCM2835_GPPUDCLK0
    Gpio.h, 7
BCM2835_GPPUDCLK1
    Gpio.h, 8
BCM2835_GPREN0
    Gpio.h, 8
BCM2835_GPREN1
    Gpio.h, 8
BCM2835_GPSET0
    Gpio.h, 8
BCM2835_GPSET1
    Gpio.h, 8
begin
    GpioRPi, 2

clearPin
    GpioRPi, 2
configureBits
    GpioRPi, 2

digitalRead
    GpioRPi, 2
digitalWrite
    GpioRPi, 2

GPIO_ADDRESS
    Gpio.h, 8
Gpio
    Gpio.cpp, 3
    Gpio.h, 8
gpio
    GpioRPi, 3
Gpio.cpp, 3
    Gpio, 3
Gpio.h, 4
    BCM2835_FSEL_MASK, 6
    BCM2835_GPAFEN0, 6
    BCM2835_GPAFEN1, 6
    BCM2835_GPAREN0, 6
    BCM2835_GPAREN1, 6
    BCM2835_GPCLR0, 6
    BCM2835_GPCLR1, 6
    BCM2835_GPEDS0, 6
    BCM2835_GPEDS1, 6
    BCM2835_GPFEN0, 6
    BCM2835_GPFEN1, 7
    BCM2835_GPFSEL0, 7
    BCM2835_GPFSEL1, 7
    BCM2835_GPFSEL2, 7
    BCM2835_GPFSEL3, 7
    BCM2835_GPFSEL4, 7
    BCM2835_GPFSEL5, 7
    BCM2835_GPHEN0, 7
    BCM2835_GPHEN1, 7
    BCM2835_GPLEN0, 7
    BCM2835_GPLEN1, 7
    BCM2835_GPLEV0, 7
    BCM2835_GPLEV1, 7
    BCM2835_GPPUD, 7
    BCM2835_GPPUDCLK0, 7
    BCM2835_GPPUDCLK1, 8
    BCM2835_GPREN0, 8
    BCM2835_GPREN1, 8

BCM2835_GPSET0, 8
BCM2835_GPSET1, 8
GPIO_ADDRESS, 8
Gpio, 8
HIGH, 8
INPUT, 8
LOW, 8
OUTPUT, 8
USE_RW_BARRIER, 8
GpioRPi, 2
begin, 2
clearPin, 2
configureBits, 2
digitalRead, 2
digitalWrite, 2
gpio, 3
pinMode, 2
safeRead, 2
safeWrite, 3
setPin, 3
stop, 3

HIGH
Gpio.h, 8

INPUT
Gpio.h, 8

LOW
Gpio.h, 8

OUTPUT
Gpio.h, 8

pinMode
GpioRPi, 2

safeRead
GpioRPi, 2
safeWrite
GpioRPi, 3
setPin
GpioRPi, 3
stop
GpioRPi, 3

USE_RW_BARRIER
Gpio.h, 8