

ZPCA9685 Library

Generated by Doxygen 1.8.14

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1 Hierarchical Index

1.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

PinExtender

ZPCA9685

2

2 Data Structure Index

2.1 Data Structures

Here are the data structures with brief descriptions:

[ZPCA9685](#)

Class that stores state and functions for interacting with [ZPCA9685](#) PWM chip 2

3 File Index

3.1 File List

Here is a list of all files with brief descriptions:

[ZPCA9685.cpp](#) 13

[ZPCA9685.h](#) 21

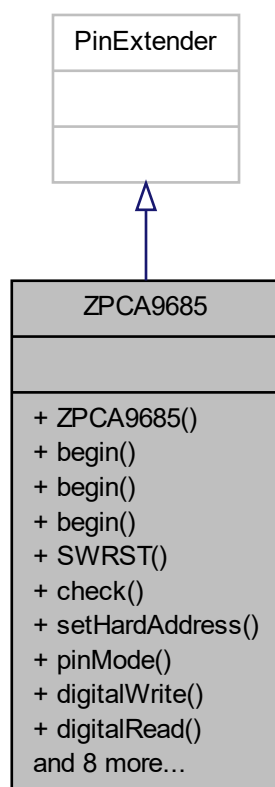
4 Data Structure Documentation

4.1 ZPCA9685 Class Reference

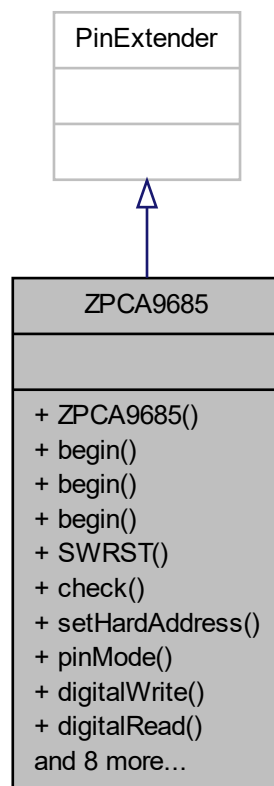
Class that stores state and functions for interacting with [ZPCA9685](#) PWM chip.

```
#include <ZPCA9685.h>
```

Inheritance diagram for ZPCA9685:



Collaboration diagram for ZPCA9685:



Public Member Functions

- [ZPCA9685](#) ()
Instantiates a new [ZPCA9685](#) PWM driver chip with the I2C address on the Wire interface. On Due we use Wire1 since its the interface on the 'default' I2C pins.
- void [begin](#) (TwoWire *MyWire, uint8_t addr)
Setups the I2C interface and hardware.
- void [begin](#) (uint8_t addr)
Setups the I2C interface and hardware.
- void [begin](#) (void)
Setups the I2C interface and hardware.
- void [SWRST](#) (void)
- bool [check](#) ()
- void [setHardAddress](#) (uint8_t A543210)
- void [pinMode](#) (uint32_t p, uint8_t d)
- void [digitalWrite](#) (uint32_t p, uint8_t d)
- uint8_t [digitalRead](#) (uint32_t p)
- void [analogWrite](#) (uint32_t ulPin, uint32_t ulValue)
- void [analogWriteResolution](#) (int res)
- void [reset](#) (void)

- Sends a reset command to the [ZPCA9685](#) chip over I2C.*
- void [setPWMFreq](#) (float freq)
Sets the PWM frequency for the entire chip, up to ~1.6 KHz.
- void [setPWM](#) (uint8_t num, uint16_t on, uint16_t off)
Sets the PWM output of one of the [ZPCA9685](#) pins.
- void [setPin](#) (uint8_t num, uint16_t val, bool invert=false)
Helper to set pin PWM output. Sets pin without having to deal with on/off tick placement and properly handles a zero value as completely off and 4095 as completely on. Optional invert parameter supports inverting the pulse for sinking to ground.
- uint32_t [analogRead](#) (uint32_t pin)
- bool [acceptlocal](#) (uint32_t p)

4.1.1 Detailed Description

Class that stores state and functions for interacting with [ZPCA9685](#) PWM chip.

Definition at line 50 of file ZPCA9685.h.

4.1.2 Constructor & Destructor Documentation

4.1.2.1 ZPCA9685()

```
ZPCA9685::ZPCA9685 ( )
```

Instantiates a new [ZPCA9685](#) PWM driver chip with the I2C address on the Wire interface. On Due we use Wire1 since its the interface on the 'default' I2C pins.

Parameters

<i>addr</i>	The 7-bit I2C address to locate this chip, default is 0x40
-------------	--

Definition at line 102 of file ZPCA9685.cpp.

4.1.3 Member Function Documentation

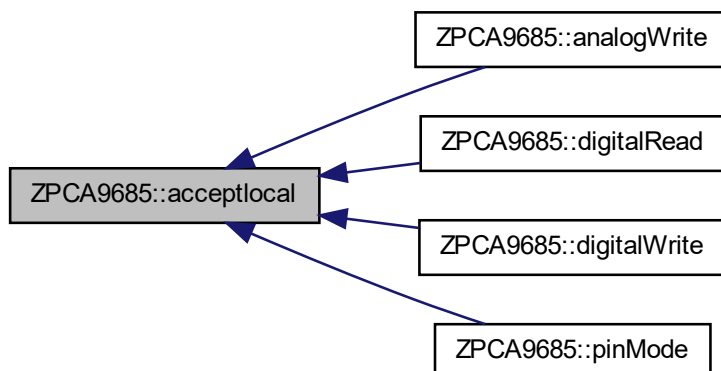
4.1.3.1 acceptlocal()

```
bool ZPCA9685::acceptlocal (
    uint32_t p )
```

Definition at line 230 of file ZPCA9685.cpp.

Referenced by [analogWrite\(\)](#), [digitalRead\(\)](#), [digitalWrite\(\)](#), and [pinMode\(\)](#).

Here is the caller graph for this function:



4.1.3.2 `analogRead()`

```
uint32_t ZPCA9685::analogRead (
    uint32_t pin )
```

Definition at line 309 of file `ZPCA9685.cpp`.

4.1.3.3 `analogWrite()`

```
void ZPCA9685::analogWrite (
    uint32_t ulPin,
    uint32_t ulValue )
```

Definition at line 288 of file `ZPCA9685.cpp`.

References `acceptlocal()`.

Here is the call graph for this function:



4.1.3.4 analogWriteResolution()

```
void ZPCA9685::analogWriteResolution (
    int res )
```

Definition at line 282 of file ZPCA9685.cpp.

4.1.3.5 begin() [1/3]

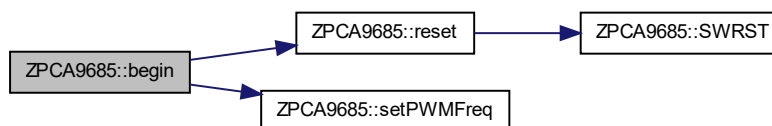
```
void ZPCA9685::begin (
    TwoWire * MyWire,
    uint8_t addr )
```

Setups the I2C interface and hardware.

Definition at line 112 of file ZPCA9685.cpp.

References `reset()`, `setPWMFreq()`, `ZPCA9685_ADDRESS`, and `ZPCA9685_ADDRESS_MASK`.

Here is the call graph for this function:



4.1.3.6 begin() [2/3]

```
void ZPCA9685::begin (
    uint8_t addr )
```

Setups the I2C interface and hardware.

Definition at line 131 of file ZPCA9685.cpp.

References `begin()`.

Here is the call graph for this function:



4.1.3.7 `begin()` [3/3]

```
void ZPCA9685::begin (
    void )
```

Setups the I2C interface and hardware.

Definition at line 141 of file ZPCA9685.cpp.

Referenced by `begin()`.

Here is the caller graph for this function:



4.1.3.8 `check()`

```
bool ZPCA9685::check ( )
```

Definition at line 88 of file ZPCA9685.cpp.

4.1.3.9 `digitalRead()`

```
uint8_t ZPCA9685::digitalRead (
    uint32_t ulPin )
```

dummy function

Definition at line 238 of file ZPCA9685.cpp.

References `acceptlocal()`.

Here is the call graph for this function:



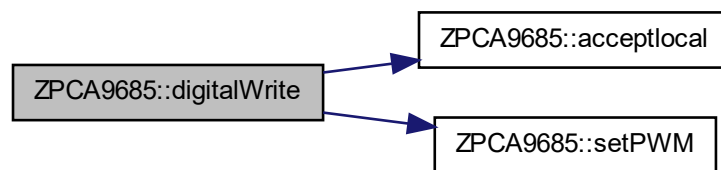
4.1.3.10 digitalWrite()

```
void ZPCA9685::digitalWrite (
    uint32_t p,
    uint8_t d )
```

Definition at line 313 of file ZPCA9685.cpp.

References `acceptlocal()`, `setPWM()`, and `ZPCA9685_PWM_FULL`.

Here is the call graph for this function:



4.1.3.11 pinMode()

```
void ZPCA9685::pinMode (
    uint32_t ulPin,
    uint8_t mode )
```

Sets the pin mode to either INPUT or OUTPUT but for all, and input doesn't exist

Definition at line 251 of file ZPCA9685.cpp.

References `acceptlocal()`, `ZPCA9685_MODE2`, and `ZPCA9685_MODE2_OUTDRV`.

Here is the call graph for this function:



4.1.3.12 reset()

```
void ZPCA9685::reset (
    void )
```

Sends a reset command to the [ZPCA9685](#) chip over I2C.

Definition at line 154 of file ZPCA9685.cpp.

References [SWRST\(\)](#), [ZPCA9685_MODE1](#), [ZPCA9685_MODE1_REG](#), [ZPCA9685_MODE_AUTOINC](#), and [ZPCA9685_MODE_RESTART](#).

Referenced by [begin\(\)](#).

Here is the call graph for this function:



Here is the caller graph for this function:



4.1.3.13 setHardAddress()

```
void ZPCA9685::setHardAddress (
    uint8_t A543210 )
```

Definition at line 91 of file ZPCA9685.cpp.

4.1.3.14 setPin()

```
void ZPCA9685::setPin (
    uint8_t num,
    uint16_t val,
    bool invert = false )
```

Helper to set pin PWM output. Sets pin without having to deal with on/off tick placement and properly handles a zero value as completely off and 4095 as completely on. Optional invert parameter supports inverting the pulse for sinking to ground.

Parameters

<i>num</i>	One of the PWM output pins, from 0 to 15
<i>val</i>	The number of ticks out of 4096 to be active, should be a value from 0 to 4095 inclusive.
<i>invert</i>	If true, inverts the output, defaults to 'false'

Definition at line 366 of file ZPCA9685.cpp.

References `setPWM()`.

Here is the call graph for this function:

4.1.3.15 `setPWM()`

```

void ZPCA9685::setPWM (
    uint8_t num,
    uint16_t on,
    uint16_t off )
  
```

Sets the PWM output of one of the [ZPCA9685](#) pins.

Parameters

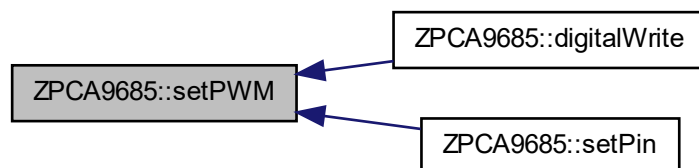
<i>num</i>	One of the PWM output pins, from 0 to 15
<i>on</i>	At what point in the 4096-part cycle to turn the PWM output ON
<i>off</i>	At what point in the 4096-part cycle to turn the PWM output OFF

Definition at line 340 of file ZPCA9685.cpp.

References `LED0_ON_L`, and `ZPCA9685_ALLLED_REG`.

Referenced by `digitalWrite()`, and `setPin()`.

Here is the caller graph for this function:



4.1.3.16 `setPWMFreq()`

```
void ZPCA9685::setPWMFreq (
    float freq )
```

Sets the PWM frequency for the entire chip, up to ~1.6 KHz.

Parameters

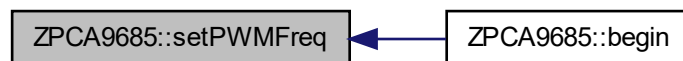
<i>freq</i>	Floating point frequency that we will attempt to match
-------------	--

Definition at line 195 of file `ZPCA9685.cpp`.

References `ZPCA9685_MODE1`, and `ZPCA9685_PRESCALE`.

Referenced by `begin()`.

Here is the caller graph for this function:



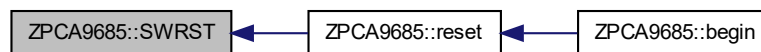
4.1.3.17 SWRST()

```
void ZPCA9685::SWRST (  
    void )
```

Definition at line 160 of file ZPCA9685.cpp.

Referenced by reset().

Here is the caller graph for this function:



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

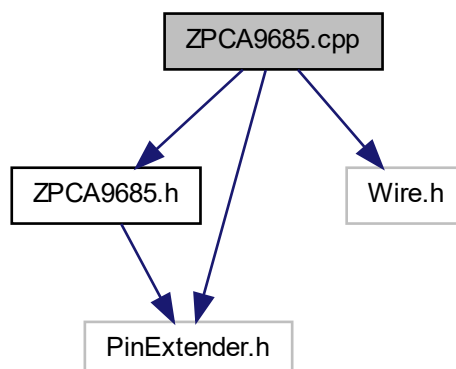
- [ZPCA9685.h](#)
- [ZPCA9685.cpp](#)

5 File Documentation

5.1 ZPCA9685.cpp File Reference

```
#include "ZPCA9685.h"  
#include <Wire.h>  
#include "PinExtender.h"
```

Include dependency graph for ZPCA9685.cpp:



Macros

- `#define ZPCA9685_MODE1_REG (byte)0x00`
- `#define ZPCA9685_MODE2_REG (byte)0x01`
- `#define ZPCA9685_SUBADR1_REG (byte)0x02`
- `#define ZPCA9685_SUBADR2_REG (byte)0x03`
- `#define ZPCA9685_SUBADR3_REG (byte)0x04`
- `#define ZPCA9685_ALLCALL_REG (byte)0x05`
- `#define ZPCA9685_LED0_REG (byte)0x06`
- `#define ZPCA9685_PRESCALE_REG (byte)0xFE`
- `#define ZPCA9685_ALLLED_REG (byte)0xFA`
- `#define ZPCA9685_ADDRESS_MASK 0x40`
- `#define ZPCA9685_ADDRESS 0x40`
- `#define ZPCA9685_SUBADR1 0x2`
- `#define ZPCA9685_SUBADR2 0x3`
- `#define ZPCA9685_SUBADR3 0x4`
- `#define ZPCA9685_MODE1 0x0`
- `#define ZPCA9685_MODE2 0x1`
- `#define ZPCA9685_PRESCALE 0xFE`
- `#define LED0_ON_L 0x6`
- `#define LED0_ON_H 0x7`
- `#define LED0_OFF_L 0x8`
- `#define LED0_OFF_H 0x9`
- `#define ALLLED_ON_L 0xFA`
- `#define ALLLED_ON_H 0xFB`
- `#define ALLLED_OFF_L 0xFC`
- `#define ALLLED_OFF_H 0xFD`
- `#define NO_CHANNEL 0xfe`
- `#define ZPCA9685_PWM_FULL (uint16_t)0x01000`
- `#define ZPCA9685_MODE_RESTART (byte)0x80`
- `#define ZPCA9685_MODE_EXTCLK (byte)0x40`
- `#define ZPCA9685_MODE_AUTOINC (byte)0x20`
- `#define ZPCA9685_MODE_SLEEP (byte)0x10`
- `#define ZPCA9685_MODE_SUBADR1 (byte)0x08`
- `#define ZPCA9685_MODE_SUBADR2 (byte)0x04`
- `#define ZPCA9685_MODE_SUBADR3 (byte)0x02`
- `#define ZPCA9685_MODE_ALLCALL (byte)0x01`
- `#define ZPCA9685_MODE2_OUTDRV (byte)0x04`
- `#define ZPCA9685_MODE2_OUTNE_HIZ (byte)0x02`

5.1.1 Macro Definition Documentation

5.1.1.1 ALLLED_OFF_H

```
#define ALLLED_OFF_H 0xFD
```

Definition at line 53 of file ZPCA9685.cpp.

5.1.1.2 ALLLED_OFF_L

```
#define ALLLED_OFF_L 0xFC
```

Definition at line 52 of file ZPCA9685.cpp.

5.1.1.3 ALLLED_ON_H

```
#define ALLLED_ON_H 0xFB
```

Definition at line 51 of file ZPCA9685.cpp.

5.1.1.4 ALLLED_ON_L

```
#define ALLLED_ON_L 0xFA
```

Definition at line 50 of file ZPCA9685.cpp.

5.1.1.5 LED0_OFF_H

```
#define LED0_OFF_H 0x9
```

Definition at line 48 of file ZPCA9685.cpp.

5.1.1.6 LED0_OFF_L

```
#define LED0_OFF_L 0x8
```

Definition at line 47 of file ZPCA9685.cpp.

5.1.1.7 LED0_ON_H

```
#define LED0_ON_H 0x7
```

Definition at line 46 of file ZPCA9685.cpp.

5.1.1.8 LED0_ON_L

```
#define LED0_ON_L 0x6
```

Definition at line 45 of file ZPCA9685.cpp.

Referenced by ZPCA9685::setPWM().

5.1.1.9 NO_CHANNEL

```
#define NO_CHANNEL 0xfe
```

Definition at line 55 of file ZPCA9685.cpp.

5.1.1.10 ZPCA9685_ADDRESS

```
#define ZPCA9685_ADDRESS 0x40
```

Definition at line 35 of file ZPCA9685.cpp.

Referenced by ZPCA9685::begin().

5.1.1.11 ZPCA9685_ADDRESS_MASK

```
#define ZPCA9685_ADDRESS_MASK 0x40
```

Definition at line 34 of file ZPCA9685.cpp.

Referenced by ZPCA9685::begin().

5.1.1.12 ZPCA9685_ALLCALL_REG

```
#define ZPCA9685_ALLCALL_REG (byte)0x05
```

Definition at line 30 of file ZPCA9685.cpp.

5.1.1.13 ZPCA9685_ALLLED_REG

```
#define ZPCA9685_ALLLED_REG (byte)0xFA
```

Definition at line 33 of file ZPCA9685.cpp.

Referenced by ZPCA9685::setPWM().

5.1.1.14 ZPCA9685_LED0_REG

```
#define ZPCA9685_LED0_REG (byte)0x06
```

Definition at line 31 of file ZPCA9685.cpp.

5.1.1.15 ZPCA9685_MODE1

```
#define ZPCA9685_MODE1 0x0
```

Definition at line 41 of file ZPCA9685.cpp.

Referenced by ZPCA9685::reset(), and ZPCA9685::setPWMFreq().

5.1.1.16 ZPCA9685_MODE1_REG

```
#define ZPCA9685_MODE1_REG (byte)0x00
```

Definition at line 25 of file ZPCA9685.cpp.

Referenced by ZPCA9685::reset().

5.1.1.17 ZPCA9685_MODE2

```
#define ZPCA9685_MODE2 0x1
```

Definition at line 42 of file ZPCA9685.cpp.

Referenced by ZPCA9685::pinMode().

5.1.1.18 ZPCA9685_MODE2_OUTDRV

```
#define ZPCA9685_MODE2_OUTDRV (byte)0x04
```

Definition at line 69 of file ZPCA9685.cpp.

Referenced by ZPCA9685::pinMode().

5.1.1.19 ZPCA9685_MODE2_OUTNE_HIZ

```
#define ZPCA9685_MODE2_OUTNE_HIZ (byte)0x02
```

Definition at line 70 of file ZPCA9685.cpp.

5.1.1.20 ZPCA9685_MODE2_REG

```
#define ZPCA9685_MODE2_REG (byte)0x01
```

Definition at line 26 of file ZPCA9685.cpp.

5.1.1.21 ZPCA9685_MODE_ALLCALL

```
#define ZPCA9685_MODE_ALLCALL (byte) 0x01
```

Definition at line 66 of file ZPCA9685.cpp.

5.1.1.22 ZPCA9685_MODE_AUTOINC

```
#define ZPCA9685_MODE_AUTOINC (byte) 0x20
```

Definition at line 61 of file ZPCA9685.cpp.

Referenced by ZPCA9685::reset().

5.1.1.23 ZPCA9685_MODE_EXTCLK

```
#define ZPCA9685_MODE_EXTCLK (byte) 0x40
```

Definition at line 60 of file ZPCA9685.cpp.

5.1.1.24 ZPCA9685_MODE_RESTART

```
#define ZPCA9685_MODE_RESTART (byte) 0x80
```

Definition at line 59 of file ZPCA9685.cpp.

Referenced by ZPCA9685::reset().

5.1.1.25 ZPCA9685_MODE_SLEEP

```
#define ZPCA9685_MODE_SLEEP (byte) 0x10
```

Definition at line 62 of file ZPCA9685.cpp.

5.1.1.26 ZPCA9685_MODE_SUBADR1

```
#define ZPCA9685_MODE_SUBADR1 (byte) 0x08
```

Definition at line 63 of file ZPCA9685.cpp.

5.1.1.27 ZPCA9685_MODE_SUBADR2

```
#define ZPCA9685_MODE_SUBADR2 (byte) 0x04
```

Definition at line 64 of file ZPCA9685.cpp.

5.1.1.28 ZPCA9685_MODE_SUBADR3

```
#define ZPCA9685_MODE_SUBADR3 (byte) 0x02
```

Definition at line 65 of file ZPCA9685.cpp.

5.1.1.29 ZPCA9685_PRESCALE

```
#define ZPCA9685_PRESCALE 0xFE
```

Definition at line 43 of file ZPCA9685.cpp.

Referenced by ZPCA9685::setPWMFreq().

5.1.1.30 ZPCA9685_PRESCALE_REG

```
#define ZPCA9685_PRESCALE_REG (byte) 0xFE
```

Definition at line 32 of file ZPCA9685.cpp.

5.1.1.31 ZPCA9685_PWM_FULL

```
#define ZPCA9685_PWM_FULL (uint16_t) 0x01000
```

Definition at line 56 of file ZPCA9685.cpp.

Referenced by ZPCA9685::digitalWrite().

5.1.1.32 ZPCA9685_SUBADR1

```
#define ZPCA9685_SUBADR1 0x2
```

Definition at line 37 of file ZPCA9685.cpp.

5.1.1.33 ZPCA9685_SUBADR1_REG

```
#define ZPCA9685_SUBADR1_REG (byte) 0x02
```

Definition at line 27 of file ZPCA9685.cpp.

5.1.1.34 ZPCA9685_SUBADR2

```
#define ZPCA9685_SUBADR2 0x3
```

Definition at line 38 of file ZPCA9685.cpp.

5.1.1.35 ZPCA9685_SUBADR2_REG

```
#define ZPCA9685_SUBADR2_REG (byte) 0x03
```

Definition at line 28 of file ZPCA9685.cpp.

5.1.1.36 ZPCA9685_SUBADR3

```
#define ZPCA9685_SUBADR3 0x4
```

Definition at line 39 of file ZPCA9685.cpp.

5.1.1.37 ZPCA9685_SUBADR3_REG

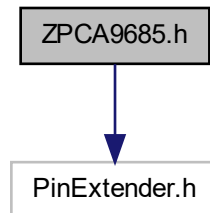
```
#define ZPCA9685_SUBADR3_REG (byte) 0x04
```

Definition at line 29 of file ZPCA9685.cpp.

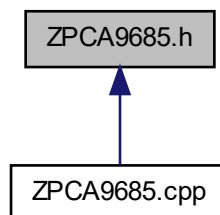
5.2 ZPCA9685.h File Reference

```
#include "PinExtender.h"
```

Include dependency graph for ZPCA9685.h:



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



Data Structures

- class [ZPCA9685](#)

Class that stores state and functions for interacting with [ZPCA9685](#) PWM chip.

Macros

- `#define PCA9685_LED15 15`
- `#define PCA9685_LED14 14`
- `#define PCA9685_LED13 13`
- `#define PCA9685_LED12 12`
- `#define PCA9685_LED11 11`
- `#define PCA9685_LED10 10`
- `#define PCA9685_LED9 9`
- `#define PCA9685_LED8 8`
- `#define PCA9685_LED7 7`

- `#define PCA9685_LED6 6`
- `#define PCA9685_LED5 5`
- `#define PCA9685_LED4 4`
- `#define PCA9685_LED3 3`
- `#define PCA9685_LED2 2`
- `#define PCA9685_LED1 1`
- `#define PCA9685_LED0 0`

5.2.1 Macro Definition Documentation

5.2.1.1 PCA9685_LED0

```
#define PCA9685_LED0 0
```

Definition at line 42 of file ZPCA9685.h.

5.2.1.2 PCA9685_LED1

```
#define PCA9685_LED1 1
```

Definition at line 41 of file ZPCA9685.h.

5.2.1.3 PCA9685_LED10

```
#define PCA9685_LED10 10
```

Definition at line 31 of file ZPCA9685.h.

5.2.1.4 PCA9685_LED11

```
#define PCA9685_LED11 11
```

Definition at line 30 of file ZPCA9685.h.

5.2.1.5 PCA9685_LED12

```
#define PCA9685_LED12 12
```

Definition at line 29 of file ZPCA9685.h.

5.2.1.6 PCA9685_LED13

```
#define PCA9685_LED13 13
```

Definition at line 28 of file ZPCA9685.h.

5.2.1.7 PCA9685_LED14

```
#define PCA9685_LED14 14
```

Definition at line 27 of file ZPCA9685.h.

5.2.1.8 PCA9685_LED15

```
#define PCA9685_LED15 15
```

Definition at line 26 of file ZPCA9685.h.

5.2.1.9 PCA9685_LED2

```
#define PCA9685_LED2 2
```

Definition at line 40 of file ZPCA9685.h.

5.2.1.10 PCA9685_LED3

```
#define PCA9685_LED3 3
```

Definition at line 39 of file ZPCA9685.h.

5.2.1.11 PCA9685_LED4

```
#define PCA9685_LED4 4
```

Definition at line 38 of file ZPCA9685.h.

5.2.1.12 PCA9685_LED5

```
#define PCA9685_LED5 5
```

Definition at line 37 of file ZPCA9685.h.

5.2.1.13 PCA9685_LED6

```
#define PCA9685_LED6 6
```

Definition at line 36 of file ZPCA9685.h.

5.2.1.14 PCA9685_LED7

```
#define PCA9685_LED7 7
```

Definition at line 35 of file ZPCA9685.h.

5.2.1.15 PCA9685_LED8

```
#define PCA9685_LED8 8
```

Definition at line 33 of file ZPCA9685.h.

5.2.1.16 PCA9685_LED9

```
#define PCA9685_LED9 9
```

Definition at line 32 of file ZPCA9685.h.

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