# Arduino IO Expander Driver

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# Contents



# 1 Class Index

## 1.1 Class List

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

# 2 File Index

## 2.1 File List

Here is a list of all files with brief descriptions:



# 3 Class Documentation

## 3.1 IOExpander Class Reference

`#include <IOExpander.h>`

### 3.1.1 Detailed Description

Arduino - IO Expander Driver.

IoExpander.h

The generic io expander driver functions

#### Author

Dalmir da Silva dalmirdasilva@gmail.com

Definition at line 14 of file IOExpander.h.

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

- IOExpander.h

## 3.2 IOExpanderMCP23X17 Class Reference

`#include <IOExpanderMCP23X17.h>`

#### Public Types

- enum SequentialOperationMode { SEQUENTIAL_MODE_ENABLE = 0x00, SEQUENTIAL_MODE_DISABLE = 0xff }
- enum Register {
  IODIRA = 0x00, IODIRB = 0x01, IPOLA = 0x02, IPOLB = 0x03,
  GPINTENA = 0x04, GPINTENB = 0x05, DEFVALA = 0x06, DEFVALB = 0x07,
  INTCONA = 0x08, INTCONB = 0x09, IOCON = 0x0a, GPPUA = 0x0c,
  GPPUB = 0x0d, INTFA = 0x0e, INTFB = 0x0f, INTCAPA = 0x10,
  INTCAPB = 0x11, GPIOA = 0x12, GPIOB = 0x13, OLATA = 0x14,
  OLATB = 0x15 }
- enum Port { PORT_A = GPIOA, PORT_B = GPIOB }
- enum Direction { OUT = 0x00, IN = 0xff }

- enum Mask {
  IOCON_BANK = 0x80, IOCON_MIRROR = 0x40, IOCON_SEQOP = 0x20, IOCON_DISSLW = 0x10,
  IOCON_HAEN = 0x08, IOCON_ODR = 0x04, IOCON_INTPOL = 0x02 }
- enum Pin {
  PIN_A0 = 0, PIN_A1 = 1, PIN_A2 = 2, PIN_A3 = 3,
  PIN_A4 = 4, PIN_A5 = 5, PIN_A6 = 6, PIN_A7 = 7,
  PIN_B0 = 8, PIN_B1 = 9, PIN_B2 = 10, PIN_B3 = 11,
  PIN_B4 = 12, PIN_B5 = 13, PIN_B6 = 14, PIN_B7 = 15 }

#### Public Member Functions

- void begin (unsigned char device)
- void pinMode (unsigned char pin, bool mode)
- void portMode (Port port, unsigned char mode)
- void digitalWrite (unsigned char pin, bool value)
- bool digitalRead (unsigned char pin)
- void portWrite (Port port, unsigned char value)
- unsigned char portRead (Port port)
- void setPinPullUp (unsigned char pin, bool pullUp)
- void setPinPolarity (unsigned char pin, bool polarity)
- void setPinInterrupt (unsigned char pin, bool interrupt)
- void setSequentialOperationMode (SequentialOperationMode mode)
- void configureRegisterBits (Register reg, unsigned char mask, unsigned char value)
- int writeRegister (Register reg, unsigned char value)
- int readRegister (Register reg)

#### Private Attributes

- unsigned char device

### 3.2.1 Detailed Description

Definition at line 29 of file IOExpanderMCP23X17.h.

### 3.2.2 Member Enumeration Documentation

#### 3.2.2.1 enum IOExpanderMCP23X17::Direction

Enumerator

***OUT***

***IN***

Definition at line 71 of file IOExpanderMCP23X17.h.

#### 3.2.2.2 enum IOExpanderMCP23X17::Mask

Enumerator

***IOCON_BANK***

***IOCON_MIRROR***

***IOCON_SEQOP***

***IOCON_DISSLW***

***IOCON_HAEN***

***IOCON_ODR***

***IOCON_INTPOL***

Definition at line 75 of file IOExpanderMCP23X17.h.

#### 3.2.2.3 enum IOExpanderMCP23X17::Pin

**Enumerator**

***PIN_A0***

***PIN_A1***

***PIN_A2***

***PIN_A3***

***PIN_A4***

***PIN_A5***

***PIN_A6***

***PIN_A7***

***PIN_B0***

***PIN_B1***

***PIN_B2***

***PIN_B3***

***PIN_B4***

***PIN_B5***

***PIN_B6***

***PIN_B7***

Definition at line 85 of file IOExpanderMCP23X17.h.

#### 3.2.2.4 enum IOExpanderMCP23X17::Port

**Enumerator**

***PORT_A***

***PORT_B***

Definition at line 67 of file IOExpanderMCP23X17.h.

#### 3.2.2.5 enum IOExpanderMCP23X17::Register

**Enumerator**

***IODIRA***

***IODIRB***

***IPOLA***

***IPOLB***

***GPINTENA***

***GPINTENB***

***DEFVALA***

***DEFVALB***

***INTCONA***

***INTCONB***

***IOCON***

***GPPUA***

***GPPUB***

***INTFA***

***INTFB***

***INTCAPA***

***INTCAPB***

***GPIOA***

***GPIOB***

***OLATA***

***OLATB***

Definition at line 42 of file IOExpanderMCP23X17.h.

#### 3.2.2.6 enum IOExpanderMCP23X17::SequentialOperationMode

**Enumerator**

***SEQUENTIAL_MODE_ENABLE***

***SEQUENTIAL_MODE_DISABLE***

Definition at line 38 of file IOExpanderMCP23X17.h.

### 3.2.3 Member Function Documentation

#### 3.2.3.1 void IOExpanderMCP23X17::begin ( unsigned char *device* )

Begins the IO expander divice.

**Parameters**

| | |
|---|---|
| *device* | The device address, or just the last 3 pins combination; |

Definition at line 16 of file IOExpanderMCP23X17.cpp.

#### 3.2.3.2 void IOExpanderMCP23X17::configureRegisterBits ( Register *reg,* unsigned char *mask,* unsigned char *value* )

Configures a registers.

**Parameters**

| | |
|---|---|
| *reg* | The register number. |
| *mask* | The mask to be used. |
| *v* | The value to be used. |

Definition at line 41 of file IOExpanderMCP23X17.cpp.

#### 3.2.3.3 bool IOExpanderMCP23X17::digitalRead ( unsigned char *pin* )

Reads the value from a specified pin, either HIGH or LOW.

**Parameters**

| | |
|---|---|
| *pin* | The pin number. |

Definition at line 36 of file IOExpanderMCP23X17.cpp.

#### 3.2.3.4 void IOExpanderMCP23X17::digitalWrite ( unsigned char *pin,* bool *value* )

Write a HIGH or a LOW value to a pin.

**Parameters**

| | |
|---|---|
| *pin* | The pin number. |
| *value* | LOW or WRITE. |

Definition at line 31 of file IOExpanderMCP23X17.cpp.

#### 3.2.3.5 void IOExpanderMCP23X17::pinMode ( unsigned char *pin*, bool *mode* )

Configures the specified pin to behave either as an input or an output.

**Parameters**

| | |
|---|---|
| *pin* | The pin number. |
| *mode* | 1 means input, 0 means output. |

Definition at line 21 of file IOExpanderMCP23X17.cpp.

#### 3.2.3.6 void IOExpanderMCP23X17::portMode ( Port *port*, unsigned char *mode* )

Configures a port to behave either as an input or an output.

**Parameters**

| | |
|---|---|
| *port* | The port. |
| *mode* | The mode. |

Definition at line 26 of file IOExpanderMCP23X17.cpp.

#### 3.2.3.7 unsigned char IOExpanderMCP23X17::portRead ( Port *port* ) [inline]

Reads a port.

**Parameters**

| | |
|---|---|
| *port* | The port to write. |

**Returns**

The value associated with the port.

Definition at line 158 of file IOExpanderMCP23X17.h.

#### 3.2.3.8 void IOExpanderMCP23X17::portWrite ( Port *port*, unsigned char *value* ) [inline]

Writes value to a port.

**Parameters**

| | |
|---|---|
| *port* | The port to write. |
| *value* | The value to write to the port. |

Definition at line 148 of file IOExpanderMCP23X17.h.

#### 3.2.3.9 int IOExpanderMCP23X17::readRegister ( Register *reg* )

Reades a value from a register.

**Parameters**

| | |
|---|---|
| *reg* | The register number. |

**Returns**

The register value.

Definition at line 56 of file IOExpanderMCP23X17.cpp.

#### 3.2.3.10 void IOExpanderMCP23X17::setPinInterrupt ( unsigned char *pin*, bool *interrupt* )

Configures a pin to clear or set the interrupt.

**Parameters**

| | |
|---|---|
| *pin* | The pin number. |
| *pullUp* | 0 means interrupt disable, 1 means interrupt enable. |

Definition at line 84 of file IOExpanderMCP23X17.cpp.

#### 3.2.3.11 void IOExpanderMCP23X17::setPinPolarity ( unsigned char *pin*, bool *polarity* )

Configures the polarity for a given pin.

**Parameters**

| | |
|---|---|
| *pin* | The pin number. |
| *pullUp* | 0 means normal, 1 means inverted polarity. |

Definition at line 79 of file IOExpanderMCP23X17.cpp.

#### 3.2.3.12 void IOExpanderMCP23X17::setPinPullUp ( unsigned char *pin*, bool *pullUp* )

Configures the pullup resistor for a given pin.

**Parameters**

| | |
|---|---|
| *pin* | The pin number. |
| *pullUp* | 0 means with, 1 means witout pullup. |

Definition at line 74 of file IOExpanderMCP23X17.cpp.

#### 3.2.3.13 void IOExpanderMCP23X17::setSequentialOperationMode ( SequentialOperationMode *mode* )

Configures the sequential/continuous operation mode.

**Parameters**

| | |
|---|---|
| *mode* | The operation mode. |

#### 3.2.3.14 int IOExpanderMCP23X17::writeRegister ( Register *reg*, unsigned char *value* )

Writes a value to a register.

**Parameters**

| | |
|---|---|
| *reg* | The register number. |
| *v* | The value to be used. |

Definition at line 49 of file IOExpanderMCP23X17.cpp.

### 3.2.4 Member Data Documentation

#### 3.2.4.1 unsigned char IOExpanderMCP23X17::device [private]

I2C device address.

Definition at line 34 of file IOExpanderMCP23X17.h.

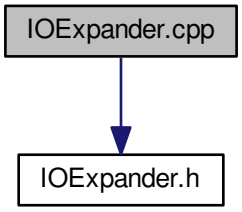
The documentation for this class was generated from the following files:

- IOExpanderMCP23X17.h
- IOExpanderMCP23X17.cpp

# 4 File Documentation

## 4.1 IOExpander.cpp File Reference

```
#include "IOExpander.h"
```
Include dependency graph for IOExpander.cpp:




### Macros

- #define __ARDUINO_DRIVER_IO_EXPANDER_CPP__ 1

### 4.1.1 Macro Definition Documentation

#### 4.1.1.1 #define __ARDUINO_DRIVER_IO_EXPANDER_CPP__ 1

Arduino - IO Expander Driver.

IoExpander.cpp

The generic io expander driver functions

**Author**

Dalmir da Silva dalmirdasilva@gmail.com

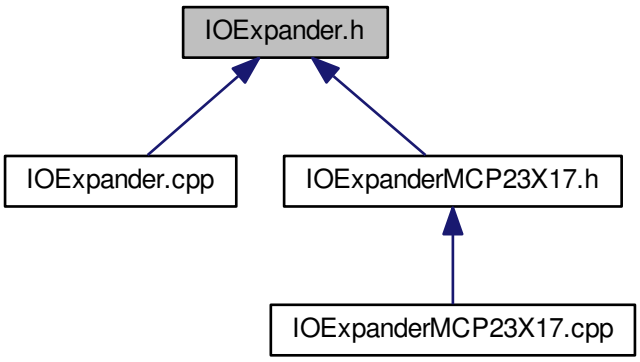
Definition at line 12 of file IOExpander.cpp.

## 4.2 IOExpander.cpp

```
00001
00011 #ifndef __ARDUINO_DRIVER_IO_EXPANDER_CPP__
00012 #define __ARDUINO_DRIVER_IO_EXPANDER_CPP__ 1
00013
00014 #include "IOExpander.h"
00015
00016 #endif /* __ARDUINO_DRIVER_IO_EXPANDER_CPP__ */
```

## 4.3 IOExpander.h File Reference

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




### Classes

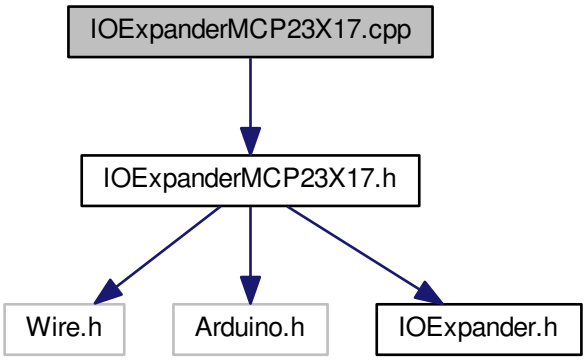
- class IOExpander

## 4.4 IOExpander.h

```
00001
00011 #ifndef __ARDUINO_DRIVER_IO_EXPANDER_H__
00012 #define __ARDUINO_DRIVER_IO_EXPANDER_H__ 1
00013
00014 class IOExpander {
00015 };
00016
00017 #endif /* __ARDUINO_DRIVER_IO_EXPANDER_H__ */
```

## 4.5 IOExpanderMCP23X17.cpp File Reference

`#include "IOExpanderMCP23X17.h"`
Include dependency graph for IOExpanderMCP23X17.cpp:




### Macros

- #define __ARDUINO_DRIVER_IO_EXPANDER_MCP23X17_CPP__ 1

### 4.5.1 Macro Definition Documentation

#### 4.5.1.1 #define __ARDUINO_DRIVER_IO_EXPANDER_MCP23X17_CPP__ 1

Arduino - IO Expander Driver.

IoExpanderMcp23x17.cpp

The MCP23X17 driver functions

**Author**

Dalmir da Silva dalmirdasilva@gmail.com

Definition at line 12 of file IOExpanderMCP23X17.cpp.

## 4.6 IOExpanderMCP23X17.cpp

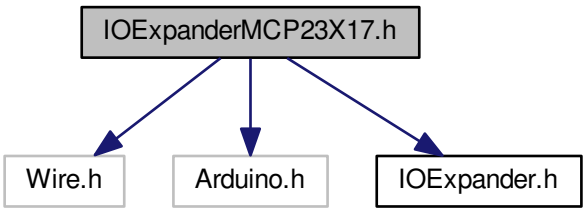
```
00001
00011 #ifndef __ARDUINO_DRIVER_IO_EXPANDER_MCP23X17_CPP__
00012 #define __ARDUINO_DRIVER_IO_EXPANDER_MCP23X17_CPP__ 1
00013
00014 #include "IOExpanderMCP23X17.h"
00015
00016 void IOExpanderMCP23X17::begin(unsigned char device) {
00017     this->device = 0x20 | (device & 0x07);
00018     Wire.begin();
00019 }
00020
00021 void IOExpanderMCP23X17::pinMode(unsigned char pin, bool mode) {
00022     Register reg = IO_EXP_PIN_TO_IODIR_REG(pin);
00023     configureRegisterBits(reg, (1 << (pin % 8)), ((mode) ? 0xff : 0x00));
00024 }
00025
```

```
00026 void IOExpanderMCP23X17::portMode(Port port, unsigned char mode) {
00027     Register reg = IO_EXP_PORT_TO_IODIR_REG(port);
00028     writeRegister(reg, mode);
00029 }
00030
00031 void IOExpanderMCP23X17::digitalWrite(unsigned char pin, bool value) {
00032     Register reg = IO_EXP_PIN_TO_GPIO_REG(pin);
00033     configureRegisterBits(reg, (1 << (pin % 8)), ((value) ? 0xff : 0x00));
00034 }
00035
00036 bool IOExpanderMCP23X17::digitalRead(unsigned char pin) {
00037     Register reg = IO_EXP_PIN_TO_GPIO_REG(pin);
00038     return (bool) (readRegister(reg) & (1 << (pin % 8)));
00039 }
00040
00041 void IOExpanderMCP23X17::configureRegisterBits(
      Register reg, unsigned char mask, unsigned char v) {
00042     unsigned char n;
00043     n = readRegister(reg);
00044     n &= ~(mask);
00045     n |= v & mask;
00046     writeRegister(reg, n);
00047 }
00048
00049 int IOExpanderMCP23X17::writeRegister(Register reg, unsigned char
      v) {
00050     Wire.beginTransmission(device);
00051     Wire.write((unsigned char) reg);
00052     Wire.write(v);
00053     return Wire.endTransmission();
00054 }
00055
00056 int IOExpanderMCP23X17::readRegister(Register reg) {
00057     char tries = 10;
00058     Wire.beginTransmission(device);
00059     Wire.write((unsigned char) reg);
00060     char status = Wire.endTransmission(false);
00061     if (status != 0) {
00062         return -(status);
00063     }
00064     Wire.requestFrom(device, (unsigned char) 1);
00065     while (!Wire.available() && --tries > 0) {
00066         delayMicroseconds(1);
00067     }
00068     if (tries == 0) {
00069         return -5;
00070     }
00071     return Wire.read();
00072 }
00073
00074 void IOExpanderMCP23X17::setPinPullUp(unsigned char pin, bool pullUp) {
00075     Register reg = IO_EXP_PIN_TO_GPPU_REG(pin);
00076     configureRegisterBits(reg, (1 << (pin % 8)), ((pullUp) ? 0xff : 0x00));
00077 }
00078
00079 void IOExpanderMCP23X17::setPinPolarity(unsigned char pin, bool polarity)
       {
00080     Register reg = IO_EXP_PIN_TO_IPOL_REG(pin);
00081     configureRegisterBits(reg, (1 << (pin % 8)), ((polarity) ? 0xff : 0x00));
00082 }
00083
00084 void IOExpanderMCP23X17::setPinInterrupt(unsigned char pin, bool
      interrupt) {
00085     Register reg = IO_EXP_PIN_TO_GPINTEN_REG(pin);
00086     configureRegisterBits(reg, (1 << (pin % 8)), ((interrupt) ? 0xff : 0x00));
00087 }
00088
00089 #endif /* __ARDUINO_DRIVER_IO_EXPANDER_MCP23X17_CPP__ */
```

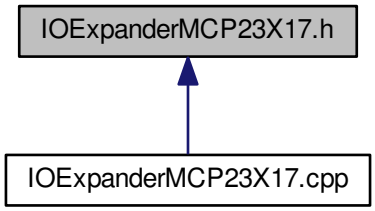
## 4.7 IOExpanderMCP23X17.h File Reference

```
#include <Wire.h>
#include <Arduino.h>
#include <IOExpander.h>
```

Include dependency graph for IOExpanderMCP23X17.h:




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




**Classes**

- class IOExpanderMCP23X17

**Macros**

- #define IO_EX_MAX_PINS 16
- #define IO_EXP_NORMALIZE_PIN(p) (((p) >= IO_EX_MAX_PINS ? IO_EX_MAX_PINS - 1 : (((p) < 0) ? 0 : (p)))
- #define IO_EXP_IS_PIN_VALID(p) ((p) < IO_EX_MAX_IO && (p) >= 0)
- #define IO_EXP_PIN_TO_GPIO_REG(p) ((p) < 8 ? GPIOA : GPIOB)
- #define IO_EXP_PIN_TO_IODIR_REG(p) ((p) < 8 ? IODIRA : IODIRB)
- #define IO_EXP_PORT_TO_IODIR_REG(p) ((p) == PORT_A ? IODIRA : IODIRB)
- #define IO_EXP_PIN_TO_GPPU_REG(p) ((p) < 8 ? GPPUA : GPPUB)
- #define IO_EXP_PIN_TO_IPOL_REG(p) ((p) < 8 ? IPOLA : IPOLB)
- #define IO_EXP_PIN_TO_GPINTEN_REG(p) ((p) < 8 ? GPINTENA : GPINTENB)

### 4.7.1 Macro Definition Documentation

#### 4.7.1.1 #define IO_EX_MAX_PINS 16

Arduino - IO Expander Driver.

IoExpanderMcp23x17.h

The MCP23X17 driver functions

**Author**

Dalmir da Silva dalmirdasilva@gmail.com

Definition at line 18 of file IOExpanderMCP23X17.h.

#### 4.7.1.2 #define IO_EXP_IS_PIN_VALID( p ) ((p) < IO_EX_MAX_IO && (p) >= 0)

Definition at line 21 of file IOExpanderMCP23X17.h.

#### 4.7.1.3 #define IO_EXP_NORMALIZE_PIN( p ) (((p) >= IO_EX_MAX_PINS ? IO_EX_MAX_PINS - 1 : (((p) < 0) ? 0 : (p)))

Definition at line 20 of file IOExpanderMCP23X17.h.

#### 4.7.1.4 #define IO_EXP_PIN_TO_GPINTEN_REG( p ) ((p) < 8 ? GPINTENA : GPINTENB)

Definition at line 27 of file IOExpanderMCP23X17.h.

#### 4.7.1.5 #define IO_EXP_PIN_TO_GPIO_REG( p ) ((p) < 8 ? GPIOA : GPIOB)

Definition at line 22 of file IOExpanderMCP23X17.h.

#### 4.7.1.6 #define IO_EXP_PIN_TO_GPPU_REG( p ) ((p) < 8 ? GPPUA : GPPUB)

Definition at line 25 of file IOExpanderMCP23X17.h.

#### 4.7.1.7 #define IO_EXP_PIN_TO_IODIR_REG( p ) ((p) < 8 ? IODIRA : IODIRB)

Definition at line 23 of file IOExpanderMCP23X17.h.

#### 4.7.1.8 #define IO_EXP_PIN_TO_IPOL_REG( p ) ((p) < 8 ? IPOLA : IPOLB)

Definition at line 26 of file IOExpanderMCP23X17.h.

#### 4.7.1.9 #define IO_EXP_PORT_TO_IODIR_REG( p ) ((p) == PORT_A ? IODIRA : IODIRB)

Definition at line 24 of file IOExpanderMCP23X17.h.

## 4.8 IOExpanderMCP23X17.h

```
00001
00011 #ifndef __ARDUINO_DRIVER_IO_EXPANDER_MCP23X17_H__
00012 #define __ARDUINO_DRIVER_IO_EXPANDER_MCP23X17_H__ 1
00013
00014 #include <Wire.h>
00015 #include <Arduino.h>
00016 #include <IOExpander.h>
00017
00018 #define IO_EX_MAX_PINS                          16
00019
00020 #define IO_EXP_NORMALIZE_PIN(p)                 (((p) >= IO_EX_MAX_PINS ? IO_EX_MAX_PINS - 1 : (((p) < 0) ?
       0 : (p)))
00021 #define IO_EXP_IS_PIN_VALID(p)                  ((p) < IO_EX_MAX_IO && (p) >= 0)
00022 #define IO_EXP_PIN_TO_GPIO_REG(p)               ((p) < 8 ? GPIOA : GPIOB)
00023 #define IO_EXP_PIN_TO_IODIR_REG(p)              ((p) < 8 ? IODIRA : IODIRB)
00024 #define IO_EXP_PORT_TO_IODIR_REG(p)             ((p) == PORT_A ? IODIRA : IODIRB)
00025 #define IO_EXP_PIN_TO_GPPU_REG(p)               ((p) < 8 ? GPPUA : GPPUB)
00026 #define IO_EXP_PIN_TO_IPOL_REG(p)               ((p) < 8 ? IPOLA : IPOLB)
00027 #define IO_EXP_PIN_TO_GPINTEN_REG(p)            ((p) < 8 ? GPINTENA : GPINTENB)
00028
00029 class IOExpanderMCP23X17 {
00030
00034     unsigned char device;
00035
00036 public:
```

```
00037
00038     enum SequentialOperationMode {
00039         SEQUENTIAL_MODE_ENABLE = 0x00,
      SEQUENTIAL_MODE_DISABLE = 0xff,
00040     };
00041
00042     enum Register {
00043         IODIRA = 0x00,
00044         IODIRB = 0x01,
00045         IPOLA = 0x02,
00046         IPOLB = 0x03,
00047         GPINTENA = 0x04,
00048         GPINTENB = 0x05,
00049         DEFVALA = 0x06,
00050         DEFVALB = 0x07,
00051         INTCONA = 0x08,
00052         INTCONB = 0x09,
00053         IOCON = 0x0a,
00054 //         IOCON = 0x0b,
00055         GPPUA = 0x0c,
00056         GPPUB = 0x0d,
00057         INTFA = 0x0e,
00058         INTFB = 0x0f,
00059         INTCAPA = 0x10,
00060         INTCAPB = 0x11,
00061         GPIOA = 0x12,
00062         GPIOB = 0x13,
00063         OLATA = 0x14,
00064         OLATB = 0x15
00065     };
00066
00067     enum Port {
00068         PORT_A = GPIOA, PORT_B = GPIOB
00069     };
00070
00071     enum Direction {
00072         OUT = 0x00, IN = 0xff
00073     };
00074
00075     enum Mask {
00076         IOCON_BANK = 0x80,
00077         IOCON_MIRROR = 0x40,
00078         IOCON_SEQOP = 0x20,
00079         IOCON_DISSLW = 0x10,
00080         IOCON_HAEN = 0x08,
00081         IOCON_ODR = 0x04,
00082         IOCON_INTPOL = 0x02
00083     };
00084
00085     enum Pin {
00086         PIN_A0 = 0,
00087         PIN_A1 = 1,
00088         PIN_A2 = 2,
00089         PIN_A3 = 3,
00090         PIN_A4 = 4,
00091         PIN_A5 = 5,
00092         PIN_A6 = 6,
00093         PIN_A7 = 7,
00094         PIN_B0 = 8,
00095         PIN_B1 = 9,
00096         PIN_B2 = 10,
00097         PIN_B3 = 11,
00098         PIN_B4 = 12,
00099         PIN_B5 = 13,
00100         PIN_B6 = 14,
00101         PIN_B7 = 15
00102     };
00103
00109     void begin(unsigned char device);
00110
00117     void pinMode(unsigned char pin, bool mode);
00118
00125     void portMode(Port port, unsigned char mode);
00126
00133     void digitalWrite(unsigned char pin, bool value);
00134
00140     bool digitalRead(unsigned char pin);
00141
00148     void inline portWrite(Port port, unsigned char value) {
00149         writeRegister((Register) port, value);
00150     }
00151
00158     unsigned char inline portRead(Port port) {
00159         return readRegister((Register) port);
00160     }
00161
00168     void setPinPullUp(unsigned char pin, bool pullUp);
```

```
00169
00176     void setPinPolarity(unsigned char pin, bool polarity);
00177
00184     void setPinInterrupt(unsigned char pin, bool interrupt);
00185
00191     void setSequentialOperationMode(
      SequentialOperationMode mode);
00192
00200     void configureRegisterBits(Register reg, unsigned char mask,
00201             unsigned char value);
00202
00209     int writeRegister(Register reg, unsigned char value);
00210
00217     int readRegister(Register reg);
00218 };
00219
00220 #endif /* __ARDUINO_DRIVER_IO_EXPANDER_MCP23X17_H__ */
```

# Index