Arduino Gyroscope Driver

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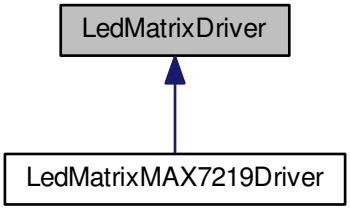
Contents

4.1 LedMatrixDriver Class Reference

`#include <LedMatrixDriver.h>`

Inheritance diagram for LedMatrixDriver:



Public Types

- enum LedValue { OFF = 0x00, ON = 0x01, RED = 0x02, GREEN = 0x04 }
- enum ShiftDirection { LEFT = 0x00, RIGHT = 0x01, UP = 0x02, DOWN = 0x03 }

Public Member Functions

- virtual ~LedMatrixDriver ()
- LedMatrixDriver (unsigned char cols, unsigned char rows)
- virtual unsigned char isOutOfBounds (unsigned char col, unsigned char row)
- virtual void clear ()=0
- virtual void fill ()=0
- virtual unsigned char getLed (unsigned char col, unsigned char row)=0
- virtual void setLed (unsigned char col, unsigned char row, unsigned char value)=0
- virtual void setRow (unsigned char row, unsigned char value)=0
- virtual void setCol (unsigned char col, unsigned char value)=0
- virtual void shiftLed (unsigned char col, unsigned char row, unsigned char direction)=0
- virtual void shiftRow (unsigned char row, unsigned char direction)=0
- virtual void shiftCol (unsigned char col, unsigned char direction)=0
- virtual void switchLeds (unsigned char colFrom, unsigned char rowFrom, unsigned char colTo, unsigned char rowTo)=0
- virtual void switchCols (unsigned char colFrom, unsigned char colTo)=0
- virtual void switchRows (unsigned char rowFrom, unsigned char rowTo)=0
- virtual void invertLed (unsigned char col, unsigned char row)=0
- virtual void invertCols (unsigned char col)=0
- virtual void invertRows (unsigned char row)=0

Protected Attributes

- unsigned char cols
- unsigned char rows

4.1.1 Detailed Description

Arduino - LED Matrix driver.

LedMatrixDriver.h

LED Matrix Driver.

Author

Dalmir da Silva dalmirdasilva@gmail.com

Definition at line 14 of file LedMatrixDriver.h.

4.1.2 Member Enumeration Documentation

4.1.2.1 enum LedMatrixDriver::LedValue

Enumerator

OFF

ON

RED

GREEN

Definition at line 22 of file LedMatrixDriver.h.

4.1.2.2 enum LedMatrixDriver::ShiftDirection

Enumerator

LEFT

RIGHT

UP

DOWN

Definition at line 26 of file LedMatrixDriver.h.

4.1.3 Constructor & Destructor Documentation

4.1.3.1 LedMatrixDriver::~LedMatrixDriver ( ) [virtual]

Definition at line 16 of file LedMatrixDriver.cpp.

4.1.3.2 LedMatrixDriver::LedMatrixDriver (unsigned char *cols*, unsigned char *rows*)

Definition at line 19 of file LedMatrixDriver.cpp.

4.1.4 Member Function Documentation

4.1.4.1 virtual void LedMatrixDriver::clear ( ) [pure virtual]

Implemented in LedMatrixMAX7219Driver.

4.1.4.2 virtual void LedMatrixDriver::fill ( ) [pure virtual]

Implemented in LedMatrixMAX7219Driver.

4.1.4.3 virtual unsigned char LedMatrixDriver::getLed (unsigned char *col,* unsigned char *row*) [pure virtual]

Implemented in LedMatrixMAX7219Driver.

4.1.4.4 virtual void LedMatrixDriver::invertCols (unsigned char *col*) [pure virtual]

Implemented in LedMatrixMAX7219Driver.

4.1.4.5 virtual void LedMatrixDriver::invertLed (unsigned char *col,* unsigned char *row*) [pure virtual]

Implemented in LedMatrixMAX7219Driver.

4.1.4.6 virtual void LedMatrixDriver::invertRows (unsigned char *row*) [pure virtual]

Implemented in LedMatrixMAX7219Driver.

4.1.4.7 unsigned char LedMatrixDriver::isOutOfBounds (unsigned char *col,* unsigned char *row*) [virtual]

Definition at line 24 of file LedMatrixDriver.cpp.

4.1.4.8 virtual void LedMatrixDriver::setCol (unsigned char *col,* unsigned char *value*) [pure virtual]

Implemented in LedMatrixMAX7219Driver.

4.1.4.9 virtual void LedMatrixDriver::setLed (unsigned char *col,* unsigned char *row,* unsigned char *value*) [pure virtual]

Implemented in LedMatrixMAX7219Driver.

4.1.4.10 virtual void LedMatrixDriver::setRow (unsigned char *row,* unsigned char *value*) [pure virtual]

Implemented in LedMatrixMAX7219Driver.

4.1.4.11 virtual void LedMatrixDriver::shiftCol (unsigned char *col,* unsigned char *direction*) [pure virtual]

Implemented in LedMatrixMAX7219Driver.

4.1.4.12 virtual void LedMatrixDriver::shiftLed (unsigned char *col,* unsigned char *row,* unsigned char *direction*) [pure virtual]

Implemented in LedMatrixMAX7219Driver.

4.1.4.13 virtual void LedMatrixDriver::shiftRow (unsigned char *row,* unsigned char *direction*) [pure virtual]

Implemented in LedMatrixMAX7219Driver.

4.1.4.14 virtual void LedMatrixDriver::switchCols (unsigned char *colFrom,* unsigned char *colTo*) [pure virtual]

Implemented in LedMatrixMAX7219Driver.

4.1.4.15 virtual void LedMatrixDriver::switchLeds (unsigned char *colFrom,* unsigned char *rowFrom,* unsigned char *colTo,* unsigned char *rowTo*) [pure virtual]

Implemented in LedMatrixMAX7219Driver.

4.1.4.16 virtual void LedMatrixDriver::switchRows (unsigned char *rowFrom,* unsigned char *rowTo*) [pure virtual]

Implemented in LedMatrixMAX7219Driver.

4.1.5 Member Data Documentation

4.1.5.1 unsigned char LedMatrixDriver::cols [protected]

Definition at line 17 of file LedMatrixDriver.h.

4.1.5.2 unsigned char LedMatrixDriver::rows [protected]

Definition at line 18 of file LedMatrixDriver.h.

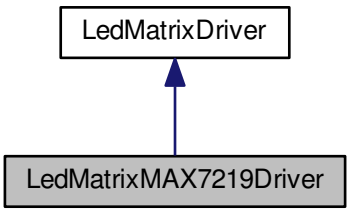
The documentation for this class was generated from the following files:

- LedMatrixDriver.h
- LedMatrixDriver.cpp

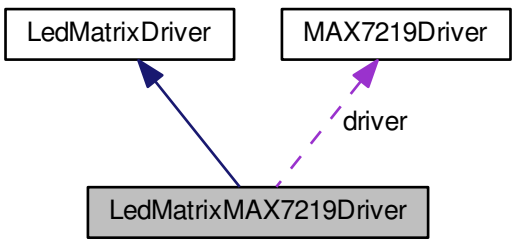
4.2 LedMatrixMAX7219Driver Class Reference

`#include <LedMatrixMAX7219Driver.h>`

Inheritance diagram for LedMatrixMAX7219Driver:



Collaboration diagram for LedMatrixMAX7219Driver:



Public Member Functions

- LedMatrixMAX7219Driver (MAX7219Driver *driver, unsigned char cols, unsigned char rows)
- ~LedMatrixMAX7219Driver ()
- virtual void clear ()

- virtual void fill ()
- virtual unsigned char getLed (unsigned char col, unsigned char row)
- virtual void setLed (unsigned char col, unsigned char row, unsigned char value)
- virtual void setRow (unsigned char row, unsigned char value)
- virtual void setCol (unsigned char col, unsigned char value)
- virtual void shiftLed (unsigned char col, unsigned char row, unsigned char direction)
- virtual void shiftRow (unsigned char row, unsigned char direction)
- virtual void shiftCol (unsigned char col, unsigned char direction)
- virtual void switchLeds (unsigned char colFrom, unsigned char rowFrom, unsigned char colTo, unsigned char rowTo)
- virtual void switchCols (unsigned char colFrom, unsigned char colTo)
- virtual void switchRows (unsigned char rowFrom, unsigned char rowTo)
- virtual void invertLed (unsigned char col, unsigned char row)
- virtual void invertCols (unsigned char col)
- virtual void invertRows (unsigned char row)

Private Attributes

- MAX7219Driver * driver
- unsigned char matrixData [MAX7219_MATRIX_WIDTH]

Static Private Attributes

- static unsigned char registerMap [MAX7219_MATRIX_WIDTH]

Additional Inherited Members

4.2.1 Detailed Description

Definition at line 21 of file LedMatrixMAX7219Driver.h.

4.2.2 Constructor & Destructor Documentation

4.2.2.1 LedMatrixMAX7219Driver::LedMatrixMAX7219Driver (MAX7219Driver * *driver,* unsigned char *cols,* unsigned char *rows*)

Definition at line 16 of file LedMatrixMAX7219Driver.cpp.

4.2.2.2 LedMatrixMAX7219Driver::~LedMatrixMAX7219Driver ( ) [inline]

Definition at line 33 of file LedMatrixMAX7219Driver.h.

4.2.3 Member Function Documentation

4.2.3.1 void LedMatrixMAX7219Driver::clear ( ) [virtual]

Implements LedMatrixDriver.

Definition at line 30 of file LedMatrixMAX7219Driver.cpp.

4.2.3.2 void LedMatrixMAX7219Driver::fill ( ) [virtual]

Implements LedMatrixDriver.

Definition at line 34 of file LedMatrixMAX7219Driver.cpp.

4.2.3.3 unsigned char LedMatrixMAX7219Driver::getLed (unsigned char *col,* unsigned char *row*) [virtual]

Implements LedMatrixDriver.

Definition at line 38 of file LedMatrixMAX7219Driver.cpp.

4.2.3.4 void LedMatrixMAX7219Driver::invertCols (unsigned char *col*) [virtual]

Implements LedMatrixDriver.

Definition at line 147 of file LedMatrixMAX7219Driver.cpp.

4.2.3.5 void LedMatrixMAX7219Driver::invertLed (unsigned char *col,* unsigned char *row*) [virtual]

Implements LedMatrixDriver.

Definition at line 143 of file LedMatrixMAX7219Driver.cpp.

4.2.3.6 void LedMatrixMAX7219Driver::invertRows (unsigned char *row*) [virtual]

Implements LedMatrixDriver.

Definition at line 151 of file LedMatrixMAX7219Driver.cpp.

4.2.3.7 void LedMatrixMAX7219Driver::setCol (unsigned char *col,* unsigned char *value*) [virtual]

Implements LedMatrixDriver.

Definition at line 73 of file LedMatrixMAX7219Driver.cpp.

4.2.3.8 void LedMatrixMAX7219Driver::setLed (unsigned char *col,* unsigned char *row,* unsigned char *value*) [virtual]

Each row is a register.

Implements LedMatrixDriver.

Definition at line 49 of file LedMatrixMAX7219Driver.cpp.

4.2.3.9 void LedMatrixMAX7219Driver::setRow (unsigned char *row,* unsigned char *value*) [virtual]

TODO: BUGGED.

Implements LedMatrixDriver.

Definition at line 65 of file LedMatrixMAX7219Driver.cpp.

4.2.3.10 void LedMatrixMAX7219Driver::shiftCol (unsigned char *col,* unsigned char *direction*) [virtual]

Implements LedMatrixDriver.

Definition at line 109 of file LedMatrixMAX7219Driver.cpp.

4.2.3.11 void LedMatrixMAX7219Driver::shiftLed (unsigned char *col,* unsigned char *row,* unsigned char *direction*) [virtual]

Implements LedMatrixDriver.

Definition at line 80 of file LedMatrixMAX7219Driver.cpp.

4.2.3.12 void LedMatrixMAX7219Driver::shiftRow (unsigned char *row,* unsigned char *direction*) [virtual]

Implements LedMatrixDriver.

Definition at line 100 of file LedMatrixMAX7219Driver.cpp.

4.2.3.13 void LedMatrixMAX7219Driver::switchCols (unsigned char *colFrom,* unsigned char *colTo*) [virtual]

Implements LedMatrixDriver.

Definition at line 133 of file LedMatrixMAX7219Driver.cpp.

4.2.3.14 void LedMatrixMAX7219Driver::switchLeds (unsigned char *colFrom,* unsigned char *rowFrom,* unsigned char *colTo,* unsigned char *rowTo*) [virtual]

Implements LedMatrixDriver.

Definition at line 126 of file LedMatrixMAX7219Driver.cpp.

4.2.3.15 void LedMatrixMAX7219Driver::switchRows (unsigned char *rowFrom,* unsigned char *rowTo*) [virtual]

Implements LedMatrixDriver.

Definition at line 138 of file LedMatrixMAX7219Driver.cpp.

4.2.4 Member Data Documentation

4.2.4.1 MAX7219Driver* LedMatrixMAX7219Driver::driver [private]

Definition at line 23 of file LedMatrixMAX7219Driver.h.

4.2.4.2 unsigned char LedMatrixMAX7219Driver::matrixData[MAX7219_MATRIX_WIDTH] [private]

Definition at line 25 of file LedMatrixMAX7219Driver.h.

4.2.4.3 unsigned char LedMatrixMAX7219Driver::registerMap [static], [private]

Initial value:

```
= {MAX7219Driver::DIGIT0,
    MAX7219Driver::DIGIT1, MAX7219Driver::DIGIT2,
      MAX7219Driver::DIGIT3,
    MAX7219Driver::DIGIT4, MAX7219Driver::DIGIT5,
      MAX7219Driver::DIGIT6,
    MAX7219Driver::DIGIT7}
```

Definition at line 26 of file LedMatrixMAX7219Driver.h.

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

- LedMatrixMAX7219Driver.h
- LedMatrixMAX7219Driver.cpp

4.3 MAX7219Driver Class Reference

`#include <MAX7219Driver.h>`

Public Types

- enum Registers {
  NOOP = 0x00, DIGIT0 = 0x01, DIGIT1 = 0x02, DIGIT2 = 0x03,
  DIGIT3 = 0x04, DIGIT4 = 0x05, DIGIT5 = 0x06, DIGIT6 = 0x07,
  DIGIT7 = 0x08, DECODE_MODE = 0x09, INTENSITY = 0x0a, SCAN_LIMIT = 0x0b,
  SHUTDOWN = 0x0c, DISPLAY_TEST = 0x0f }
- enum ScanLimit {
  DIGIT_UPTO_0 = 0x00, DIGIT_UPTO_1 = 0x01, DIGIT_UPTO_2 = 0x02, DIGIT_UPTO_3 = 0x03,
  DIGIT_UPTO_4 = 0x04, DIGIT_UPTO_5 = 0x05, DIGIT_UPTO_6 = 0x06, DIGIT_UPTO_7 = 0x07 }

- enum ShutdownMode { SHUTDOWN_MODE = 0x00, NORMAL_MODE = 0x01 }
- enum DecodeMode { NO_DECODE = 0x00, DECODE_0 = 0x01, DECODE_0_TO_3 = 0x0f, DECODE_0_TO_7 = 0xff }
- enum TestMode { TEST_MODE_OFF = 0x00, TEST_MODE_ON = 0x01 }

Public Member Functions

- MAX7219Driver (unsigned char dataPin, unsigned char clockPin, unsigned char loadPin)
- void setShutdown (unsigned char value)
- void setDecodeMode (unsigned char mode)
- void setDisplayIntensity (unsigned char intensity)
- void setScanLimit (unsigned char limit)
- void setTestMode (unsigned char mode)
- void fill (unsigned char patern)
- void writeRegister (unsigned char reg, unsigned char value)
- void sendPackage (unsigned int package)
- unsigned int createPackage (unsigned char reg, unsigned char payload)

Private Attributes

- unsigned char dataPin
- unsigned char clockPin
- unsigned char loadPin

4.3.1 Detailed Description

Definition at line 30 of file MAX7219Driver.h.

4.3.2 Member Enumeration Documentation

4.3.2.1 enum MAX7219Driver::DecodeMode

Enumerator

NO_DECODE

DECODE_0

DECODE_0_TO_3

DECODE_0_TO_7

Definition at line 70 of file MAX7219Driver.h.

4.3.2.2 enum MAX7219Driver::Registers

Enumerator

NOOP

DIGIT0

DIGIT1

DIGIT2

DIGIT3

DIGIT4

DIGIT5

DIGIT6

DIGIT7

DECODE_MODE

INTENSITY

SCAN_LIMIT

SHUTDOWN

DISPLAY_TEST

Definition at line 38 of file MAX7219Driver.h.

4.3.2.3 enum MAX7219Driver::ScanLimit

Enumerator

DIGIT_UPTO_0

DIGIT_UPTO_1

DIGIT_UPTO_2

DIGIT_UPTO_3

DIGIT_UPTO_4

DIGIT_UPTO_5

DIGIT_UPTO_6

DIGIT_UPTO_7

Definition at line 55 of file MAX7219Driver.h.

4.3.2.4 enum MAX7219Driver::ShutdownMode

Enumerator

SHUTDOWN_MODE

NORMAL_MODE

Definition at line 66 of file MAX7219Driver.h.

4.3.2.5 enum MAX7219Driver::TestMode

Enumerator

TEST_MODE_OFF

TEST_MODE_ON

Definition at line 74 of file MAX7219Driver.h.

4.3.3 Constructor & Destructor Documentation

4.3.3.1 MAX7219Driver::MAX7219Driver (unsigned char *dataPin,* unsigned char *clockPin,* unsigned char *loadPin*)

Definition at line 16 of file MAX7219Driver.cpp.

4.3.4 Member Function Documentation

4.3.4.1 unsigned int MAX7219Driver::createPackage (unsigned char *reg,* unsigned char *payload*)

Definition at line 71 of file MAX7219Driver.cpp.

4.3.4.2 void MAX7219Driver::fill (unsigned char *patern*)

Definition at line 46 of file MAX7219Driver.cpp.

4.3.4.3 void MAX7219Driver::sendPackage (unsigned int *package*)

Definition at line 59 of file MAX7219Driver.cpp.

4.3.4.4 void MAX7219Driver::setDecodeMode (unsigned char *mode*)

Definition at line 30 of file MAX7219Driver.cpp.

4.3.4.5 void MAX7219Driver::setDisplayIntensity (unsigned char *intensity*)

Definition at line 34 of file MAX7219Driver.cpp.

4.3.4.6 void MAX7219Driver::setScanLimit (unsigned char *limit*)

Definition at line 38 of file MAX7219Driver.cpp.

4.3.4.7 void MAX7219Driver::setShutdown (unsigned char *value*)

Definition at line 26 of file MAX7219Driver.cpp.

4.3.4.8 void MAX7219Driver::setTestMode (unsigned char *mode*)

Definition at line 42 of file MAX7219Driver.cpp.

4.3.4.9 void MAX7219Driver::writeRegister (unsigned char *reg,* unsigned char *value*)

Definition at line 54 of file MAX7219Driver.cpp.

4.3.5 Member Data Documentation

4.3.5.1 unsigned char MAX7219Driver::clockPin [private]

Definition at line 33 of file MAX7219Driver.h.

4.3.5.2 unsigned char MAX7219Driver::dataPin [private]

Definition at line 32 of file MAX7219Driver.h.

4.3.5.3 unsigned char MAX7219Driver::loadPin [private]

Definition at line 34 of file MAX7219Driver.h.

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

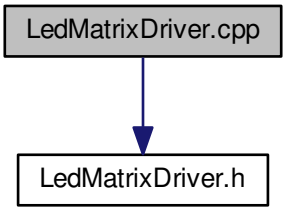
- MAX7219Driver.h
- MAX7219Driver.cpp

5 File Documentation

5.1 LedMatrixDriver.cpp File Reference

```
#include "LedMatrixDriver.h"
```

Include dependency graph for LedMatrixDriver.cpp:



Macros

- #define __ARDUINO_DRIVER_LED_MATRIX_CPP__ 1

5.1.1 Macro Definition Documentation

5.1.1.1 #define __ARDUINO_DRIVER_LED_MATRIX_CPP__ 1

Arduino - LED Matrix driver.

LedMatrixDriver.cpp

LED Matrix Driver.

Author

Dalmir da Silva dalmirdasilva@gmail.com

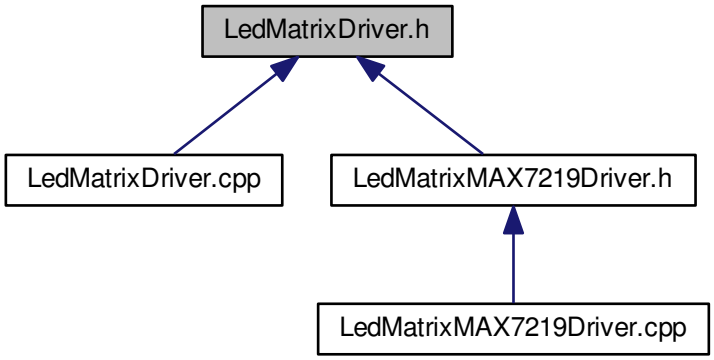
Definition at line 12 of file LedMatrixDriver.cpp.

5.2 LedMatrixDriver.cpp

```
00001
00011 #ifndef __ARDUINO_DRIVER_LED_MATRIX_CPP__
00012 #define __ARDUINO_DRIVER_LED_MATRIX_CPP__ 1
00013
00014 #include "LedMatrixDriver.h"
00015
00016 LedMatrixDriver::~LedMatrixDriver() {
00017 }
00018
00019 LedMatrixDriver::LedMatrixDriver(unsigned char cols, unsigned char rows) {
00020   this->cols = cols;
00021   this->rows = rows;
00022 }
00023
00024 unsigned char LedMatrixDriver::isOutOfBounds(unsigned char col,
00025     unsigned char row) {
00026   if (col >= this->cols || row >= this->rows) {
00027     return true;
00028   }
00029   return false;
00030 }
00031
00032 #endif /* __ARDUINO_DRIVER_LED_MATRIX_CPP__ */
```

5.3 LedMatrixDriver.h File Reference

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



Classes

- class LedMatrixDriver

5.4 LedMatrixDriver.h

```
00001
00011 #ifndef __ARDUINO_DRIVER_LED_MATRIX_H__
00012 #define __ARDUINO_DRIVER_LED_MATRIX_H__ 1
00013
00014 class LedMatrixDriver {
00015
00016 protected:
00017   unsigned char cols;
00018   unsigned char rows;
00019
00020 public:
00021
00022   enum LedValue {
00023     OFF = 0x00, ON = 0x01, RED = 0x02, GREEN = 0x04
00024   };
00025
00026   enum ShiftDirection {
00027     LEFT = 0x00, RIGHT = 0x01, UP = 0x02, DOWN = 0x03
00028   };
00029
00033   virtual ~LedMatrixDriver();
00034
00038   LedMatrixDriver(unsigned char cols, unsigned char rows);
00039
00043   virtual unsigned char isOutOfBounds(unsigned char col, unsigned char row);
00044
00048   virtual void clear() = 0;
00049
00053   virtual void fill() = 0;
00054
00058   virtual unsigned char getLed(unsigned char col, unsigned char row) = 0;
00059
00063   virtual void setLed(unsigned char col, unsigned char row,
00064       unsigned char value) = 0;
00065
00069   virtual void setRow(unsigned char row, unsigned char value) = 0;
00070
00074   virtual void setCol(unsigned char col, unsigned char value) = 0;
00075
00079   virtual void shiftLed(unsigned char col, unsigned char row,
00080       unsigned char direction) = 0;
```

```
00081
00085   virtual void shiftRow(unsigned char row, unsigned char direction) = 0;
00086
00090   virtual void shiftCol(unsigned char col, unsigned char direction) = 0;
00091
00095   virtual void switchLeds(unsigned char colFrom, unsigned char rowFrom,
00096       unsigned char colTo, unsigned char rowTo) = 0;
00097
00101   virtual void switchCols(unsigned char colFrom, unsigned char colTo) = 0;
00102
00106   virtual void switchRows(unsigned char rowFrom, unsigned char rowTo) = 0;
00107
00111   virtual void invertLed(unsigned char col, unsigned char row) = 0;
00112
00116   virtual void invertCols(unsigned char col) = 0;
00117
00121   virtual void invertRows(unsigned char row) = 0;
00122 };
00123
00124 #endif /* __ARDUINO_DRIVER_LED_MATRIX_H__ */
```

5.5 LedMatrixDriverMAX7221.cpp File Reference

Macros

- #define __ARDUINO_DRIVER_LED_MATRIX_MAX7221_CPP__ 1

5.5.1 Macro Definition Documentation

5.5.1.1 #define __ARDUINO_DRIVER_LED_MATRIX_MAX7221_CPP__ 1

Arduino - LED Matrix MAX7221 driver.

LEDMatrixDriverMAX7221.cpp

LED Matrix MAX7221 driver.

Author

Dalmir da Silva dalmirdasilva@gmail.com

Definition at line 12 of file LedMatrixDriverMAX7221.cpp.

5.6 LedMatrixDriverMAX7221.cpp

```
00001
00011 #ifndef __ARDUINO_DRIVER_LED_MATRIX_MAX7221_CPP__
00012 #define __ARDUINO_DRIVER_LED_MATRIX_MAX7221_CPP__ 1
00013
00014
00015 #endif /* __ARDUINO_DRIVER_LED_MATRIX_MAX7221_CPP__ */
```

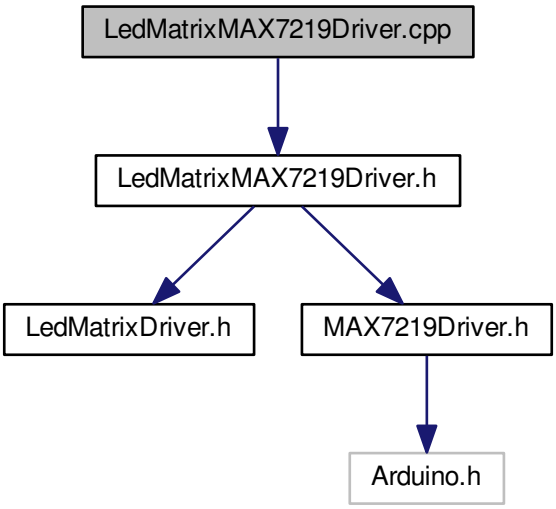
5.7 LedMatrixDriverMAX7221.h File Reference

5.8 LedMatrixDriverMAX7221.h

```
00001
00011 #ifndef __ARDUINO_DRIVER_LED_MATRIX_MAX7221_H__
00012 #define __ARDUINO_DRIVER_LED_MATRIX_MAX7221_H__ 1
00013
00014
00015 #endif /* __ARDUINO_DRIVER_LED_MATRIX_MAX7221_H__ */
```

5.9 LedMatrixMAX7219Driver.cpp File Reference

`#include "LedMatrixMAX7219Driver.h"`
Include dependency graph for LedMatrixMAX7219Driver.cpp:



Macros

- #define __ARDUINO_DRIVER_LED_MATRIX_MAX7219_CPP__ 1

5.9.1 Macro Definition Documentation

5.9.1.1 #define __ARDUINO_DRIVER_LED_MATRIX_MAX7219_CPP__ 1

Arduino - LED Matrix MAX7219 driver.

LedMatrixMAX7219Driver.cpp

LED Matrix MAX7219 driver.

Author

Dalmir da Silva dalmirdasilva@gmail.com

Definition at line 12 of file LedMatrixMAX7219Driver.cpp.

5.10 LedMatrixMAX7219Driver.cpp

```
00001
00011 #ifndef __ARDUINO_DRIVER_LED_MATRIX_MAX7219_CPP__
00012 #define __ARDUINO_DRIVER_LED_MATRIX_MAX7219_CPP__ 1
00013
00014 #include "LedMatrixMAX7219Driver.h"
00015
00016 LedMatrixMAX7219Driver::LedMatrixMAX7219Driver(
      MAX7219Driver *driver,
00017         unsigned char cols, unsigned char rows) :
```

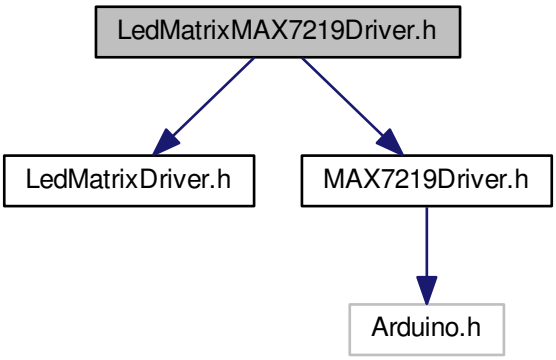
```
00018         LedMatrixDriver(cols, rows), driver(driver) {
00019     driver->setTestMode(MAX7219Driver::TEST_MODE_OFF);
00020     driver->setScanLimit(MAX7219Driver::DIGIT_UPTO_7);
00021     driver->setDisplayIntensity(0xff);
00022     driver->setDecodeMode(MAX7219Driver::NO_DECODE);
00023     driver->setShutdown(MAX7219Driver::NORMAL_MODE);
00024     driver->fill(0x00);
00025     for (unsigned char i = 0; i < MAX7219_MATRIX_WIDTH; i++) {
00026         matrixData[i] = 0x00;
00027     }
00028 }
00029
00030 void LedMatrixMAX7219Driver::clear() {
00031     driver->fill(0x00);
00032 }
00033
00034 void LedMatrixMAX7219Driver::fill() {
00035     driver->fill(0xff);
00036 }
00037
00038 unsigned char LedMatrixMAX7219Driver::getLed(unsigned char col,
00039         unsigned char row) {
00040     unsigned char entry, mask;
00041     entry = matrixData[col];
00042     mask = 0x01 << row;
00043     return (entry & mask) ? LedMatrixDriver::ON :
      LedMatrixDriver::OFF;
00044 }
00045
00049 void LedMatrixMAX7219Driver::setLed(unsigned char col, unsigned char row,
00050         unsigned char value) {
00051     unsigned char entry, mask = 0;
00052     if (!isOutOfBounds(col, row)) {
00053         entry = matrixData[col];
00054         mask = 0x01 << row;
00055         if (value) {
00056             entry |= mask;
00057         } else {
00058             entry &= ~mask;
00059         }
00060         matrixData[col] = entry;
00061         driver->writeRegister(registerMap[col], entry);
00062     }
00063 }
00064
00065 void LedMatrixMAX7219Driver::setRow(unsigned char row, unsigned char value) {
00066     if (!isOutOfBounds(0, row)) {
00067         for (unsigned char i = 0; i < rows; i++) {
00068             setLed(row, i, value);
00069         }
00070     }
00071 }
00072
00073 void LedMatrixMAX7219Driver::setCol(unsigned char col, unsigned char value) {
00074     if (!isOutOfBounds(col, 0)) {
00075         matrixData[col] = value;
00076         driver->writeRegister(registerMap[col], value);
00077     }
00078 }
00079
00080 void LedMatrixMAX7219Driver::shiftLed(unsigned char col, unsigned char row,
00081         unsigned char direction) {
00082     unsigned char led;
00083     if (!isOutOfBounds(col, row)) {
00084         led = getLed(col, row);
00085         setLed(col, row, (led ? LedMatrixDriver::OFF :
      LedMatrixDriver::ON));
00086         if (direction == LEFT) {
00087             col--;
00088         } else if (direction == RIGHT) {
00089             col++;
00090         } else if (direction == UP) {
00091             row++;
00092         } else {
00093             row--;
00094         }
00095         setLed((col % cols), (row % rows), (
00096                 led ? LedMatrixDriver::ON : LedMatrixDriver::OFF));
00097     }
00098 }
00099
00100 void LedMatrixMAX7219Driver::shiftRow(unsigned char row,
00101         unsigned char direction) {
00102     if (!isOutOfBounds(0, row)) {
00103         for (unsigned char i = 0; i < cols; i++) {
00104             shiftLed(i, row, direction);
00105         }
```

```
00106     }
00107 }
00108
00109 void LedMatrixMAX7219Driver::shiftCol(unsigned char col,
00110         unsigned char direction) {
00111     if (!isOutOfBounds(col, 0)) {
00112         unsigned char current = matrixData[col];
00113         matrixData[col] = ~current;
00114         driver->writeRegister(registerMap[col],
      matrixData[col]);
00115         if (direction == RIGHT) {
00116             col++;
00117         } else {
00118             col--;
00119         }
00120         col %= cols;
00121         matrixData[col] = current;
00122         driver->writeRegister(registerMap[col],
      matrixData[col]);
00123     }
00124 }
00125
00126 void LedMatrixMAX7219Driver::switchLeds(unsigned char colFrom,
00127         unsigned char rowFrom, unsigned char colTo, unsigned char rowTo) {
00128     unsigned char led = getLed(colFrom, rowFrom);
00129     setLed(colFrom, rowFrom, getLed(colTo, rowTo));
00130     setLed(colTo, rowTo, led);
00131 }
00132
00133 void LedMatrixMAX7219Driver::switchCols(unsigned char colFrom,
00134         unsigned char colTo) {
00135
00136 }
00137
00138 void LedMatrixMAX7219Driver::switchRows(unsigned char rowFrom,
00139         unsigned char rowTo) {
00140
00141 }
00142
00143 void LedMatrixMAX7219Driver::invertLed(unsigned char col, unsigned char
      row) {
00144
00145 }
00146
00147 void LedMatrixMAX7219Driver::invertCols(unsigned char col) {
00148
00149 }
00150
00151 void LedMatrixMAX7219Driver::invertRows(unsigned char row) {
00152
00153 }
00154
00155 #if MAX7219_MATRIX_INVERT_COLUMN_ORDER == 1
00156 unsigned char LedMatrixMAX7219Driver::registerMap[] = {
      MAX7219Driver::DIGIT7,
00157         MAX7219Driver::DIGIT6, MAX7219Driver::DIGIT5,
      MAX7219Driver::DIGIT4,
00158         MAX7219Driver::DIGIT3, MAX7219Driver::DIGIT2,
      MAX7219Driver::DIGIT1,
00159         MAX7219Driver::DIGIT0};
00160 #else
00161 unsigned char LedMatrixMAX7219Driver::registerMap[] = {
      MAX7219Driver::DIGIT0,
00162     MAX7219Driver::DIGIT1, MAX7219Driver::DIGIT2,
      MAX7219Driver::DIGIT3,
00163     MAX7219Driver::DIGIT4, MAX7219Driver::DIGIT5,
      MAX7219Driver::DIGIT6,
00164     MAX7219Driver::DIGIT7};
00165 #endif /* MATRIX_COL_ORDER */
00166
00167 #endif /* __ARDUINO_DRIVER_LED_MATRIX_MAX7219_CPP__ */
```

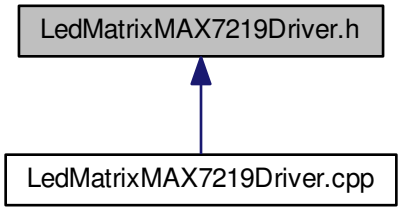
5.11 LedMatrixMAX7219Driver.h File Reference

```
#include <LedMatrixDriver.h>
#include <MAX7219Driver.h>
```

Include dependency graph for LedMatrixMAX7219Driver.h:



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



Classes

- class LedMatrixMAX7219Driver

Macros

- #define MAX7219_MATRIX_WIDTH 8
- #define MAX7219_MATRIX_HEIGHT 8
- #define MAX7219_MATRIX_INVERT_COLUMN_ORDER 0

5.11.1 Macro Definition Documentation

5.11.1.1 #define MAX7219_MATRIX_HEIGHT 8

Definition at line 18 of file LedMatrixMAX7219Driver.h.

5.11.1.2 #define MAX7219_MATRIX_INVERT_COLUMN_ORDER 0

Definition at line 19 of file LedMatrixMAX7219Driver.h.

5.11.1.3 #define MAX7219_MATRIX_WIDTH 8

Arduino - LED Matrix MAX7219 driver.

LedMatrixDriverMAX7219.h

LED Matrix MAX7219 driver.

Author

Dalmir da Silva dalmirdasilva@gmail.com

Definition at line 17 of file LedMatrixMAX7219Driver.h.

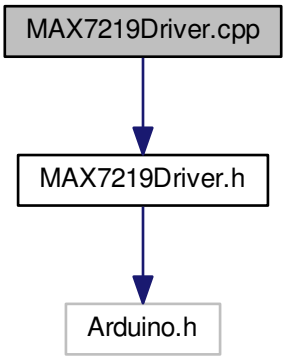
5.12 LedMatrixMAX7219Driver.h

```
00001
00011 #ifndef __ARDUINO_DRIVER_LED_MATRIX_MAX7219_H__
00012 #define __ARDUINO_DRIVER_LED_MATRIX_MAX7219_H__ 1
00013
00014 #include <LedMatrixDriver.h>
00015 #include <MAX7219Driver.h>
00016
00017 #define MAX7219_MATRIX_WIDTH 8
00018 #define MAX7219_MATRIX_HEIGHT 8
00019 #define MAX7219_MATRIX_INVERT_COLUMN_ORDER 0
00020
00021 class LedMatrixMAX7219Driver : public LedMatrixDriver {
00022
00023     MAX7219Driver *driver;
00024
00025     unsigned char matrixData[MAX7219_MATRIX_WIDTH];
00026     static unsigned char registerMap[MAX7219_MATRIX_WIDTH];
00027
00028 public:
00029
00030     LedMatrixMAX7219Driver(MAX7219Driver *driver, unsigned char
    cols,
00031             unsigned char rows);
00032
00033     ~LedMatrixMAX7219Driver() {
00034     }
00035
00039     virtual void clear();
00040
00044     virtual void fill();
00045
00049     virtual unsigned char getLed(unsigned char col, unsigned char row);
00050
00054     virtual void setLed(unsigned char col, unsigned char row,
00055             unsigned char value);
00056
00060     virtual void setRow(unsigned char row, unsigned char value);
00061
00065     virtual void setCol(unsigned char col, unsigned char value);
00066
00070     virtual void shiftLed(unsigned char col, unsigned char row,
00071             unsigned char direction);
00072
00076     virtual void shiftRow(unsigned char row, unsigned char direction);
00077
00081     virtual void shiftCol(unsigned char col, unsigned char direction);
00082
00086     virtual void switchLeds(unsigned char colFrom, unsigned char rowFrom,
00087             unsigned char colTo, unsigned char rowTo);
00088
00092     virtual void switchCols(unsigned char colFrom, unsigned char colTo);
00093
00097     virtual void switchRows(unsigned char rowFrom, unsigned char rowTo);
00098
00102     virtual void invertLed(unsigned char col, unsigned char row);
00103
00107     virtual void invertCols(unsigned char col);
00108
00112     virtual void invertRows(unsigned char row);
```

```
00113 };
00114
00115 #endif /* __ARDUINO_DRIVER_LED_MATRIX_MAX7219_H__ */
```

5.13 MAX7219Driver.cpp File Reference

`#include "MAX7219Driver.h"`
Include dependency graph for MAX7219Driver.cpp:



Macros

- #define __ARDUINO_DRIVER_MAX7219_CPP__ 1

5.13.1 Macro Definition Documentation

5.13.1.1 #define __ARDUINO_DRIVER_MAX7219_CPP__ 1

Arduino - MAX7219 driver.

MAX7219Driver.cpp

MAX7219 driver.

Author

Dalmir da Silva dalmirdasilva@gmail.com

Definition at line 12 of file MAX7219Driver.cpp.

5.14 MAX7219Driver.cpp

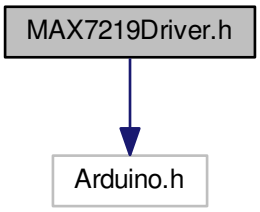
```
00001
00011 #ifndef __ARDUINO_DRIVER_MAX7219_CPP__
00012 #define __ARDUINO_DRIVER_MAX7219_CPP__ 1
00013
00014 #include "MAX7219Driver.h"
00015
00016 MAX7219Driver::MAX7219Driver(unsigned char dataPin, unsigned char clockPin,
00017         unsigned char loadPin) {
00018     this->dataPin = dataPin;
00019     this->clockPin = clockPin;
```

```
00020     this->loadPin = loadPin;
00021     pinMode(dataPin, OUTPUT);
00022     pinMode(clockPin, OUTPUT);
00023     pinMode(loadPin, OUTPUT);
00024 }
00025
00026 void MAX7219Driver::setShutdown(unsigned char value) {
00027     writeRegister(SHUTDOWN, value);
00028 }
00029
00030 void MAX7219Driver::setDecodeMode(unsigned char mode) {
00031     writeRegister(DECODE_MODE, mode);
00032 }
00033
00034 void MAX7219Driver::setDisplayIntensity(unsigned char intensity) {
00035     writeRegister(INTENSITY, intensity);
00036 }
00037
00038 void MAX7219Driver::setScanLimit(unsigned char limit) {
00039     writeRegister(SCAN_LIMIT, limit);
00040 }
00041
00042 void MAX7219Driver::setTestMode(unsigned char mode) {
00043     writeRegister(DISPLAY_TEST, mode);
00044 }
00045
00046 void MAX7219Driver::fill(unsigned char patern) {
00047     unsigned char digitMap[MAX7219_WIDTH] = {DIGIT0, DIGIT1,
    DIGIT2, DIGIT3,
00048             DIGIT4, DIGIT5, DIGIT6, DIGIT7};
00049     for (unsigned char i = 0; i < MAX7219_WIDTH; i++) {
00050         writeRegister(digitMap[i], patern);
00051     }
00052 }
00053
00054 void MAX7219Driver::writeRegister(unsigned char reg, unsigned char value) {
00055     unsigned int package = createPackage(reg, value);
00056     sendPackage(package);
00057 }
00058
00059 void MAX7219Driver::sendPackage(unsigned int package) {
00060     unsigned char reg = (unsigned char) ((package >> 8) & 0xff);
00061     unsigned char order = MSBFIRST;
00062     if (reg >= DIGIT0 && reg <= DIGIT7) {
00063         order = MAX7219_DIGIR_ORDER;
00064     }
00065     digitalWrite(loadPin, LOW);
00066     shiftOut(dataPin, clockPin, MSBFIRST, reg);
00067     shiftOut(dataPin, clockPin, order, (unsigned char) (package & 0xff));
00068     digitalWrite(loadPin, HIGH);
00069 }
00070
00071 unsigned int MAX7219Driver::createPackage(unsigned char reg,
00072         unsigned char payload) {
00073     unsigned int package;
00074     package = (0x000f & reg);
00075     package <<= 8;
00076     package |= (0x00ff & payload);
00077     return package;
00078 }
00079
00080 #endif /* __ARDUINO_DRIVER_MAX7219_CPP__ */
```

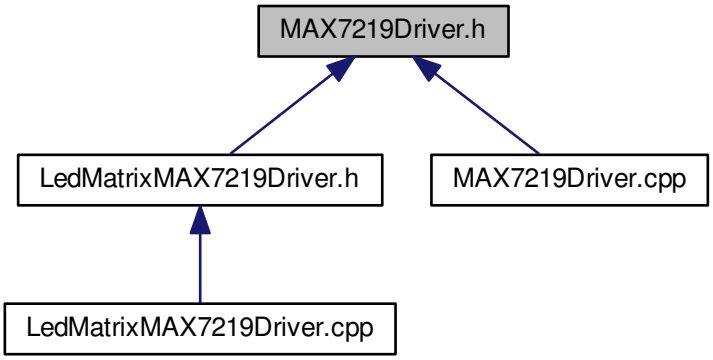
5.15 MAX7219Driver.h File Reference

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

Include dependency graph for MAX7219Driver.h:



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



Classes

- class MAX7219Driver

Macros

- #define MAX7219_WIDTH 8
- #define MAX7219_HEIGHT 8
- #define MAX7219_DIGIR_ORDER LSBFIRST

5.15.1 Macro Definition Documentation

5.15.1.1 #define MAX7219_DIGIR_ORDER LSBFIRST

Definition at line 28 of file MAX7219Driver.h.