

Erriez JY-LKM1638 board library for Arduino
1.1.0

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Chapter 1

JY-LKM1638 7-segment display / button library for Arduino

This is a JY-MCU JY-LKM1638 library for Arduino.

This board supports:

- 3-wire serial interface
- TM1638 LED driver and key-scan chip
- Power: 3.3V .. 5V
- 8 digits 7-segment display
- 8 dual color LEDs
- 8 buttons

Order number

[Google.com](#) [DX.com](#) [SKU: 81873](#) [AliExpress.com](#) [eBay.com](#) Many more...

Note: This library has not been tested with a different "LED&KEY" board.

Hardware

Connect GND and +5V to the Arduino board.

Connect the following pins to the Arduino DIGITAL pins:

- DIO (Bi-directional data input/output)
- STB (Chip select)
- CLK (Clock)

Note: Some Arduino boards cannot deliver enough 5V power to drive the LED's.

Pins

Pin	LKM-1638	Arduino UNO / Nano / Mega2560 / Leonardo / Pro Micro	Node MCU	LOLIN32
1	VCC	5V (or 3.3V)	GND	GND
2	GND	GND	3V3	3V3
3	CLK	Digital pin 2	D2	0
4	DIO	Digital pin 3	D3	4
5	STB1	Digital pin 4	D4	5

Examples

Examples | JY-LKM1638:

- [Brightness](#)
- [Buttons](#)
- [Counter](#)
- [Date](#)
- [Demo](#)
- [Temperature](#)
- [TestLEDs](#)
- [Time](#)

Documentation

- [Doxygen online HTML](#)
- [Doxygen PDF](#)

Terms:

```

1 Segment:   One LED in a 7-segment display
2 Digit:     One 7-segment display (Value 0..9 and A..F)
3 Dot:       The dot LED in a 7-segment digit
4 Pos:       Print position 0...7 (MSB bit 7: left .. LB bit 0: right)
5 Radius:    DEC for decimal, HEX for hexadecimal, BIN for binary
6 MaxDigits: Reserve a number of digits to print a value
7 Pad:       Display fixed number of digits with 0 padding
8 Overflow:  Value does not fit on the display, display minus chars
9 LSB:       Most right digit, dual color LED8 or switch (SW8)
10 MSB:      Most left digit, dual color LED1 or switch (SW1)
```

Usage

Initialization

```

1 {c++}
2 #include <LKM1638Board.h>
3
4 // Connect display pins to the Arduino DIGITAL pins
5 #define TM1638_CLK_PIN  2
6 #define TM1638_DIO_PIN  3
7 #define TM1638_STB0_PIN 4
8
9 // Create LKM1638 board
10 LKM1638Board lkm1638(TM1638_CLK_PIN, TM1638_DIO_PIN, TM1638_STB0_PIN);
11
12 void setup()
13 {
14     // Initialize LKM1638Board
15     lkm1638.begin();
16 }
```

Read 8 buttons

Buttons are 8-bit with bit 7 most left switch, bit 0 most right switch.

Note: The text on the board counts from S1 to S8!

```
1 {c++}
2 uint8_t buttons = lkm1638.getButtons();
```

Control 8 dual color LED's

Dual color LED 7 = most left (Text LED8) Dual color LED 0 = most right (Text LED0)

```
1 {c++}
2 // Turn LED 0 red on (first LED on the right)
3 lkm1638.setColorLED(0, LedRed);
4
5 // Turn LED 0 green on
6 lkm1638.setColorLED(0, LedGreen);
7
8 // Turn LED 0 off
9 lkm1638.setColorLED(0, LedOff);
10
11 // Turn multiple LEDs on, color red
12 lkm1638.colorLEDsOn(0xA9, LedRed);
13
14 // Turn multiple LEDs off
15 lkm1638.colorLEDsOff(0x1F);
```

Clear display

```
1 {c++}
2 lkm1638.clear();
```

Set/get print display position

The print position can be set from 0..7. 7 = most left digit 0 = most right digit

```
1 {c++}
2 // Set position 4
3 lkm1638.setPrintPos(4);
4
5 // Get print position
6 uint8_t pos = lkm1638.getPrintPos();
```

Print variable on 7-segment display

Printing starts from digit right to left with an optional maximum number of digits.

Minus '-' chars will be displayed when the value is out of range, or does not fit on the display.

Optional padding can be used to display zero's. This is for example useful to print hours and minutes with fixed 2 digits.

```
1 {c++}
2 // Print int16_t on print position
3 lkml638.print(1234);
4
5 // Print signed 32-bit value
6 lkml638.print(-1234567);
7
8 // Print 16-bit unsigned casted value
9 lkml638.print((uint16_t)65535);
10
11 // Print 16-bit hexadecimal unsigned value
12 uint16_t value = 0xBEEF;
13 lkml638.print(value, HEX);
14
15 // Print value with maximum 2 digits
16 uint8_t value = 99;
17 lkml638.print(value++, DEC, 2);
18
19 // Print -- when value is greater than 2 digits
20 lkml638.print(value, DEC, 2);
21
22 // Print 16-bit unsigned value with max 4 digits and 4 digits padding: 0009
23 uint16_t value = 9;
24 lkml638.print(value, DEC, 4, 4);
25
26 // Print 32-bit unsigned value
27 lkml638.print(12345678UL);
28
29 // Print binary uint8_t 0xA9 = 10101001
30 uint8_t value = 0xA9;
31 lkml638.print(value, BIN, 8, 8);
```

Control 8 display dots

```
1 {c++}
2 // Turn one dot on in digit 7 (most left)
3 lkml638.dotOn(7);
4
5 // Turn one dot off in digit 0 (most right)
6 lkml638.dotOff(0);
7
8 // Set multiple dots on and off
9 lkml638.setDots(0x85);
```

Display special characters

```
1 {c++}
2 // Turn digit off
3 lkml638.setSegmentsDigit(5, SEGMENTS_OFF);
4
5 // Display minus character
6 lkml638.setSegmentsDigit(4, SEGMENTS_MINUS);
7
8 // Display degree selsius symbol + C
9 lkml638.setSegmentsDigit(1, SEGMENTS_DEGREE);
10 lkml638.setSegmentsDigit(0, SEGMENTS_C);
```

Write a custom character to the display

```
1 {c++}
2 // Display single LED in a digit
3 lkml638.setSegmentsDigit(0, 0b0001000);
```


Library dependencies

- [Erriez TM1638](#)

Library installation

Please refer to the [Wiki](#) page.

Other Arduino Libraries and Sketches from Erriez

- [Erriez Libraries and Sketches](#)

Chapter 2

Hierarchical Index

2.1 Class Hierarchy

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

TM1638	
LKM1638Board	13

Chapter 3

Class Index

3.1 Class List

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

LKM1638Board	
LKM1638Board class, derived from TM1638 library	13

Chapter 4

File Index

4.1 File List

Here is a list of all documented files with brief descriptions:

LKM1638Board.cpp	
JY-LKM1638 board v1.1 library for Arduino	23
LKM1638Board.h	
JY-LKM1638 board v1.1 library for Arduino	23

Chapter 5

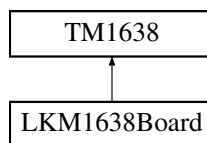
Class Documentation

5.1 LKM1638Board Class Reference

[LKM1638Board](#) class, derived from TM1638 library.

```
#include <LKM1638Board.h>
```

Inheritance diagram for LKM1638Board:



Public Member Functions

- [LKM1638Board](#) (uint8_t clkPin, uint8_t dioPin, uint8_t stbPin)
LKM1638 constructor.
- uint8_t [getButtons](#) ()
Read buttons.
- void [clear](#) ()
Turn all LED's off.
- void [setColorLED](#) (uint8_t led, [LedColor](#) color)
Set dual color LED.
- void [colorLEDsOn](#) (uint8_t leds, [LedColor](#) color)
Turn multiple color LED's on.
- void [colorLEDsOff](#) (uint8_t leds)
Turn multiple color LED's off.
- void [refresh](#) ()
Refresh display.
- void [dotOn](#) (uint8_t pos)
Turn dot LED on.
- void [dotOff](#) (uint8_t pos)
Turn dot LED off.

- void **setDots** (uint8_t dots)
Turn multiple dots on or off.
- void **setPrintPos** (uint8_t pos)
Set print position.
- uint8_t **getPrintPos** ()
Get print position.
- void **setSegmentsDigit** (uint8_t pos, uint8_t leds)
Write LED segments of a digit.
- void **setDigit** (uint8_t pos, uint8_t digit)
Write digit.
- void **print** (uint8_t value)
Print uint8_t value.
- void **print** (uint8_t value, uint8_t radius)
Print uint8_t with radius.
- void **print** (uint8_t value, uint8_t radius, uint8_t maxDigits)
Print uint8_t with radius and maximum number of digits.
- void **print** (uint8_t value, uint8_t radius, uint8_t maxDigits, uint8_t pad)
Print uint8_t with radius, maximum number of digits and padding digits.
- void **print** (uint16_t value)
- void **print** (uint16_t value, uint8_t radius)
- void **print** (uint16_t value, uint8_t radius, uint8_t maxDigits)
- void **print** (uint16_t value, uint8_t radius, uint8_t maxDigits, uint8_t pad)
- void **print** (unsigned long value)
- void **print** (unsigned long value, uint8_t radius)
- void **print** (unsigned long value, uint8_t radius, uint8_t maxDigits)
- void **print** (unsigned long value, uint8_t radius, uint8_t maxDigits, uint8_t pad)
- void **print** (int8_t value)
- void **print** (int8_t value, uint8_t radius)
- void **print** (int8_t value, uint8_t radius, uint8_t maxDigits)
- void **print** (int16_t value)
- void **print** (int16_t value, uint8_t radius)
- void **print** (int16_t value, uint8_t radius, uint8_t maxDigits)
- void **print** (long value)
- void **print** (long value, uint8_t radius)
- void **print** (long value, uint8_t radius, uint8_t maxDigits)

Protected Member Functions

- void **writeDigit** (uint8_t pos)
Write digit position.
- void **writeUnsignedValue** (uint32_t value, uint8_t radius, uint8_t maxDigits, uint8_t pad)
Write unsigned value to display.
- void **writeSignedValue** (int32_t value, uint8_t radius, uint8_t maxDigits)
Write signed value to display.
- uint8_t **getNumDigits** (uint32_t value, uint8_t radius)
Get number of digits of a signed 32-bit value.
- void **displayOverflow** (uint8_t numDigits)
Display overflow with - characters.
- uint8_t **swapBits** (uint8_t data)
Swap bits.
- uint8_t **swapPos** (uint8_t pos)
Swap digit position.
- uint8_t **swapLeds** (uint8_t led)
Swap dual color LED's.

Protected Attributes

- `uint8_t _leds` [NUM_DIGITS]
LED digits.
- `uint8_t _pos`
Print position.
- `uint8_t _dots`
Dot LED's.

5.1.1 Detailed Description

`LKM1638Board` class, derived from TM1638 library.

Definition at line 66 of file LKM1638Board.h.

5.1.2 Constructor & Destructor Documentation

5.1.2.1 `LKM1638Board::LKM1638Board (uint8_t clkPin, uint8_t dioPin, uint8_t stbPin)`

LKM1638 constructor.

Parameters

<i>clkPin</i>	Clock pin
<i>dioPin</i>	Data pin (bi-directional)
<i>stbPin</i>	Strobe pin (low is enable)

Definition at line 80 of file LKM1638Board.cpp.

5.1.3 Member Function Documentation

5.1.3.1 `void LKM1638Board::colorLEDsOff (uint8_t leds)`

Turn multiple color LED's off.

Parameters

<i>leds</i>	Byte with 8 LED's
-------------	-------------------

Definition at line 190 of file LKM1638Board.cpp.

5.1.3.2 `void LKM1638Board::colorLEDsOn (uint8_t leds, LedColor color)`

Turn multiple color LED's on.

Parameters

<i>leds</i>	Byte with 8 LED's
<i>color</i>	0: Off 1: Green 2: Red

Definition at line 177 of file LKM1638Board.cpp.

5.1.3.3 void LKM1638Board::displayOverflow (uint8_t *numDigits*) [protected]

Display overflow with - characters.

Parameters

<i>numDigits</i>	Number of digits to display
------------------	-----------------------------

Definition at line 575 of file LKM1638Board.cpp.

5.1.3.4 void LKM1638Board::dotOff (uint8_t *pos*)

Turn dot LED off.

Parameters

<i>pos</i>	Position 0..7
------------	---------------

Definition at line 275 of file LKM1638Board.cpp.

5.1.3.5 void LKM1638Board::dotOn (uint8_t *pos*)

Turn dot LED on.

Parameters

<i>pos</i>	Position 0..7
------------	---------------

Definition at line 263 of file LKM1638Board.cpp.

5.1.3.6 uint8_t LKM1638Board::getButtons ()

Read buttons.

Returns

Value of 8 buttons

Definition at line 93 of file LKM1638Board.cpp.

5.1.3.7 `uint8_t LKM1638Board::getNumDigits (uint32_t value, uint8_t radius)` [protected]

Get number of digits of a signed 32-bit value.

Parameters

<i>value</i>	32-bit signed value
<i>radius</i>	Radius

Returns

Number of digits

Definition at line 554 of file LKM1638Board.cpp.

5.1.3.8 `uint8_t LKM1638Board::getPrintPos ()`

Get print position.

Returns

Position 0..7

Definition at line 311 of file LKM1638Board.cpp.

5.1.3.9 `void LKM1638Board::print (uint8_t value)`

Print uint8_t value.

Parameters

<i>value</i>	Display value 0..255
--------------	----------------------

Definition at line 323 of file LKM1638Board.cpp.

5.1.3.10 `void LKM1638Board::print (uint8_t value, uint8_t radius)`

Print uint8_t with radius.

Parameters

<i>value</i>	Display value 0..255
<i>radius</i>	Radius 2 for binary, 10 for decimal, 16 for HEX

Definition at line 333 of file LKM1638Board.cpp.

5.1.3.11 void LKM1638Board::print (uint8_t *value*, uint8_t *radius*, uint8_t *maxDigits*)

Print uint8_t with radius and maximum number of digits.

Parameters

<i>value</i>	Display value 0..255
<i>radius</i>	Radius 2 for binary, 10 for decimal, 16 for HEX
<i>maxDigits</i>	Maximum number of digits

Definition at line 344 of file LKM1638Board.cpp.

5.1.3.12 void LKM1638Board::print (uint8_t *value*, uint8_t *radius*, uint8_t *maxDigits*, uint8_t *pad*)

Print uint8_t with radius, maximum number of digits and padding digits.

Parameters

<i>value</i>	Display value 0..255
<i>radius</i>	Radius 2 for binary, 10 for decimal, 16 for HEX
<i>maxDigits</i>	Maximum number of digits
<i>pad</i>	Number of digits starting with a 0

Definition at line 356 of file LKM1638Board.cpp.

5.1.3.13 void LKM1638Board::setColorLED (uint8_t *led*, LedColor *color*)

Set dual color LED.

Parameters

<i>led</i>	LED number (0 = most right, 7 = most left)
<i>color</i>	0: Off 1: Green 2: Red

Definition at line 144 of file LKM1638Board.cpp.

5.1.3.14 void LKM1638Board::setDigit (uint8_t *pos*, uint8_t *digit*)

Write digit.

Parameters

<i>pos</i>	Position 0..7
<i>digit</i>	Value 0..9, A..F

Definition at line 235 of file LKM1638Board.cpp.

5.1.3.15 void LKM1638Board::setDots (uint8_t *dots*)

Turn multiple dots on or off.

Parameters

<i>dots</i>	Byte with dots
-------------	----------------

Definition at line 287 of file LKM1638Board.cpp.

5.1.3.16 void LKM1638Board::setPrintPos (uint8_t *pos*)

Set print position.

Parameters

<i>pos</i>	Position 0..7
------------	---------------

Definition at line 300 of file LKM1638Board.cpp.

5.1.3.17 void LKM1638Board::setSegmentsDigit (uint8_t *pos*, uint8_t *segments*)

Write LED segments of a digit.

Parameters

<i>pos</i>	Position 0..7
<i>segments</i>	Segment LED's

Definition at line 222 of file LKM1638Board.cpp.

5.1.3.18 uint8_t LKM1638Board::swapBits (uint8_t *data*) [protected]

Swap bits.

Parameters

<i>data</i>	9-bit unsigned value
-------------	----------------------

Returns

Swapped bits

Definition at line 610 of file LKM1638Board.cpp.

5.1.3.19 `uint8_t LKM1638Board::swapLeds (uint8_t led)` [protected]

Swap dual color LED's.

Parameters

<i>led</i>	LED's
------------	-------

Returns

Swapped LED bits

Definition at line 599 of file LKM1638Board.cpp.

5.1.3.20 `uint8_t LKM1638Board::swapPos (uint8_t pos)` [protected]

Swap digit position.

Parameters

<i>pos</i>	Position
------------	----------

Returns

Swapped position

Definition at line 588 of file LKM1638Board.cpp.

5.1.3.21 `void LKM1638Board::writeDigit (uint8_t pos)` [protected]

Write digit position.

Parameters

<i>pos</i>	Digit number 0 is most right digit, 7 is most left digit
------------	--

Definition at line 206 of file LKM1638Board.cpp.

5.1.3.22 `void LKM1638Board::writeSignedValue (int32_t value, uint8_t radius, uint8_t maxDigits)` [protected]

Write signed value to display.

Parameters

<i>value</i>	signed value $-2^{31}..2^{31}$
<i>radius</i>	Radius 2 for binary, 10 for decimal, 16 for HEX
<i>maxDigits</i>	Maximum number of digits

Definition at line 506 of file LKM1638Board.cpp.

5.1.3.23 void LKM1638Board::writeUnsignedValue (uint32_t *value*, uint8_t *radius*, uint8_t *maxDigits*, uint8_t *pad*)
[protected]

Write unsigned value to display.

Parameters

<i>value</i>	Unsigned value 0..2 ³²
<i>radius</i>	Radius 2 for binary, 10 for decimal, 16 for HEX
<i>maxDigits</i>	Maximum number of digits
<i>pad</i>	Number of digits starting with a 0

Definition at line 471 of file LKM1638Board.cpp.

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

- [LKM1638Board.h](#)
- [LKM1638Board.cpp](#)

Chapter 6

File Documentation

6.1 LKM1638Board.cpp File Reference

JY-LKM1638 board v1.1 library for Arduino.

```
#include <pgmspace.h>
#include "LKM1638Board.h"
```

6.1.1 Detailed Description

JY-LKM1638 board v1.1 library for Arduino.

Source: <https://github.com/Erriez/ErriezTM1638> Source: <https://github.com/Erriez/ErriezLKM1638> Documentation: <https://erriez.github.io/ErriezLKM1638>

6.2 LKM1638Board.h File Reference

JY-LKM1638 board v1.1 library for Arduino.

```
#include <Arduino.h>
#include <TM1638.h>
```

Classes

- class [LKM1638Board](#)
[LKM1638Board](#) class, derived from [TM1638](#) library.

Macros

- `#define NUM_COLOR_LEDS 8`
Number of dual color LED's.
- `#define NUM_DIGITS 8`
Number of digits.
- `#define SEGMENTS_OFF 0b00000000`
7-segment digit all LED's off
- `#define SEGMENTS_MINUS 0b01000000`
7-segment digit minus character
- `#define SEGMENTS_DEGREE 0b01100011`
7-segment digit degree symbol
- `#define SEGMENTS_C 0b00111001`
7-segment digit Celsius symbol

Enumerations

- `enum LedColor { LedOff = 0, LedRed = 1, LedGreen = 2 }`
Dual color LED.

6.2.1 Detailed Description

JY-LKM1638 board v1.1 library for Arduino.

Source: <https://github.com/Erriez/ErriezTM1638> Source: <https://github.com/Erriez/ErriezLKM1638> Documentation: <https://erriez.github.io/ErriezLKM1638>

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