



**WHAODA**

EXCITING ELECTRONICS

# WPI438

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**0.96 INCH OLED SCREEN WITH I2C FOR ARDUINO®**



USER MANUAL



# USER MANUAL

## 1. Introduction

To all residents of the European Union

### Important environmental information about this product



This symbol on the device or the package indicates that disposal of the device after its lifecycle could harm the environment. Do not dispose of the unit (or batteries) as unsorted municipal waste; it should be taken to a specialized company for recycling. This device should be returned to your distributor or to a local recycling service. Respect the local environmental rules.

**If in doubt, contact your local waste disposal authorities.**

Thank you for choosing Velleman®! Please read the manual thoroughly before bringing this device into service. If the device was damaged in transit, do not install or use it and contact your dealer.

## 2. Safety Instructions



- This device can be used by children aged from 8 years and above, and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning the use of the device in a safe way and understand the hazards involved. Children shall not play with the device. Cleaning and user maintenance shall not be made by children without supervision.



- Indoor use only.  
Keep away from rain, moisture, splashing and dripping liquids.

## 3. General Guidelines



- Refer to the Velleman® Service and Quality Warranty on the last pages of this manual.
- Familiarise yourself with the functions of the device before actually using it.
- All modifications of the device are forbidden for safety reasons. Damage caused by user modifications to the device is not covered by the warranty.
- Only use the device for its intended purpose. Using the device in an unauthorised way will void the warranty.
- Damage caused by disregard of certain guidelines in this manual is not covered by the warranty and the dealer will not accept responsibility for any ensuing defects or problems.
- Nor Velleman nv nor its dealers can be held responsible for any damage (extraordinary, incidental or indirect) – of any nature (financial, physical...) arising from the possession, use or failure of this product.
- Due to constant product improvements, the actual product appearance might differ from the shown images.
- Product images are for illustrative purposes only.
- Do not switch the device on immediately after it has been exposed to changes in temperature. Protect the device against damage by leaving it switched off until it has reached room temperature.
- Keep this manual for future reference.

## 4. What is Arduino®

Arduino® is an open-source prototyping platform based in easy-to-use hardware and software. Arduino® boards are able to read inputs – light-on sensor, a finger on a button or a Twitter message – and turn it into an output – activating of a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so, you use the Arduino programming language (based on Wiring) and the Arduino® software IDE (based on Processing).

Surf to [www.arduino.cc](http://www.arduino.cc) for more information.

## 5. Overview

### WPI438

OLED displays are great in many ways. They use very little power, are bright, easy to read with a large viewing angle and have high resolution considering their small size.

resolution: 128 x 64 dots  
 viewing angle: > 160°  
 working voltage: 3 to 5 V  
 recommended library: U8glib  
 interface: I2C  
 driver: SSD1306  
 working temperature: -30 °C to 70 °C  
 OLED colour: blue  
 I/O level: 3.3-5 V  
 dimensions: 27 x 27 mm

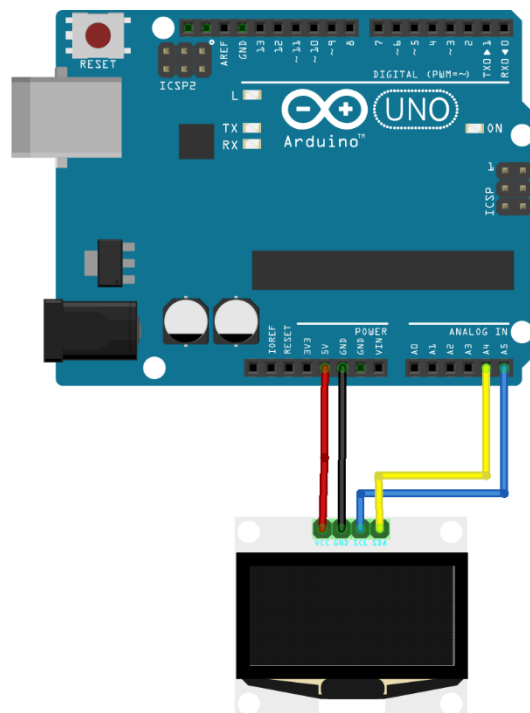
## 6. Pin Layout

VCC	3.3-5 V power supply
Gnd	ground
SCL	serial clock line
SDA	serial data line

## 7. Example

Connection.

Vcc=====5V  
 Gnd=====Gnd  
 SCL=====A5  
 SDA=====A4



Go to the product page on [www.velleman.eu](http://www.velleman.eu) and download the U8glib.zip file.

Start the Arduino® IDE and import this library: Sketch → Include Library → Add Zip library.

Once finished, go back to Sketch → Include Library → Manage library's, and scroll down until you find the U8glib library. Select this library and tap "Update". Now you have the latest version with examples.

Go to Files → Examples and scroll down to U8glib. Open the example Graphicstest.

In the sketch "Graphicstest", several types of displays can be selected. Just "un-comment" the one you need.

For the WPI438 you have to un-comment:

```
U8GLIB_SSD1306_128X64 u8g(U8G_I2C_OPT_NO_ACK); // Display which does not send AC
```

Compile and upload the sketch to your Arduino® compatible board and enjoy!

The "Graphicstest" sketch with only the correct driver line for VMA438 looks like this:

```
/*
GraphicsTest.pde

>>> Before compiling: Please remove comment from the constructor of the
>>> connected graphics display (see below).

Universal 8bit Graphics Library, https://github.com/olikraus/u8glib/

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CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT,
STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE)
ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF
ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

*/
```

```

#include "U8glib.h"

// setup u8g object, please remove comment from one of the following constructor calls
// IMPORTANT NOTE: The following list is incomplete. The complete list of supported
// devices with all constructor calls is here: https://github.com/olikraus/u8glib/wiki/device

U8GLIB_SSD1306_128X64 u8g(U8G_I2C_OPT_NO_ACK); // Display which does not send AC VMA438 -
Velleman , UN-comment this line as it is now

void u8g_prepare(void) {
    u8g.setFont(u8g_font_6x10);
    u8g.setFontRefHeightExtendedText();
    u8g.setDefaultForegroundColor();
    u8g.setFontPosTop();
}

void u8g_box_frame(uint8_t a) {
    u8g.drawStr( 0, 0, "drawBox");
    u8g.drawBox(5,10,20,10);
    u8g.drawBox(10+a,15,30,7);
    u8g.drawStr( 0, 30, "drawFrame");
    u8g.drawFrame(5,10+30,20,10);
    u8g.drawFrame(10+a,15+30,30,7);
}

void u8g_disc_circle(uint8_t a) {
    u8g.drawStr( 0, 0, "drawDisc");
    u8g.drawDisc(10,18,9);
    u8g.drawDisc(24+a,16,7);
    u8g.drawStr( 0, 30, "drawCircle");
    u8g.drawCircle(10,18+30,9);
    u8g.drawCircle(24+a,16+30,7);
}

void u8g_r_frame(uint8_t a) {
    u8g.drawStr( 0, 0, "drawRFrame/Box");
    u8g.drawRFrame(5, 10,40,30, a+1);
    u8g.drawRBox(50, 10,25,40, a+1);
}

void u8g_string(uint8_t a) {
    u8g.drawStr(30+a,31, " 0");
    u8g.drawStr90(30,31+a, " 90");
    u8g.drawStr180(30-a,31, " 180");
    u8g.drawStr270(30,31-a, " 270");
}

void u8g_line(uint8_t a) {
    u8g.drawStr( 0, 0, "drawLine");
    u8g.drawLine(7+a, 10, 40, 55);
}

```

```

u8g.drawLine(7+a*2, 10, 60, 55);
u8g.drawLine(7+a*3, 10, 80, 55);
u8g.drawLine(7+a*4, 10, 100, 55);
}

void u8g_triangle(uint8_t a) {
  uint16_t offset = a;
  u8g.drawStr( 0, 0, "drawTriangle");
  u8g.drawTriangle(14,7, 45,30, 10,40);
  u8g.drawTriangle(14+offset,7-offset, 45+offset,30-offset, 57+offset,10-offset);
  u8g.drawTriangle(57+offset*2,10, 45+offset*2,30, 86+offset*2,53);
  u8g.drawTriangle(10+offset,40+offset, 45+offset,30+offset, 86+offset,53+offset);
}

void u8g_ascii_1() {
  char s[2] = " ";
  uint8_t x, y;
  u8g.drawStr( 0, 0, "ASCII page 1");
  for( y = 0; y < 6; y++ ) {
    for( x = 0; x < 16; x++ ) {
      s[0] = y*16 + x + 32;
      u8g.drawStr(x*7, y*10+10, s);
    }
  }
}

void u8g_ascii_2() {
  char s[2] = " ";
  uint8_t x, y;
  u8g.drawStr( 0, 0, "ASCII page 2");
  for( y = 0; y < 6; y++ ) {
    for( x = 0; x < 16; x++ ) {
      s[0] = y*16 + x + 160;
      u8g.drawStr(x*7, y*10+10, s);
    }
  }
}

void u8g_extra_page(uint8_t a)
{
  if ( u8g.getMode() == U8G_MODE_HICOLOR || u8g.getMode() == U8G_MODE_R3G3B2 ) {
    /* draw background (area is 128x128) */
    u8g_uint_t r, g, b;
    b = a << 5;
    for( g = 0; g < 64; g++ )
    {
      for( r = 0; r < 64; r++ )
      {
        u8g.setRGB(r<<2, g<<2, b );
        u8g.drawPixel(g, r);
      }
    }
    u8g.setRGB(255,255,255);
    u8g.drawStr( 66, 0, "Color Page");
  }
}

```

```

else if ( u8g.getMode() == U8G_MODE_GRAY2BIT )
{
  u8g.drawStr( 66, 0, "Gray Level");
  u8g.setColorIndex(1);
  u8g.drawBox(0, 4, 64, 32);
  u8g.drawBox(70, 20, 4, 12);
  u8g.setColorIndex(2);
  u8g.drawBox(0+1*a, 4+1*a, 64-2*a, 32-2*a);
  u8g.drawBox(74, 20, 4, 12);
  u8g.setColorIndex(3);
  u8g.drawBox(0+2*a, 4+2*a, 64-4*a, 32-4*a);
  u8g.drawBox(78, 20, 4, 12);
}
else
{
  u8g.drawStr( 0, 12, "setScale2x2");
  u8g.setScale2x2();
  u8g.drawStr( 0, 6+a, "setScale2x2");
  u8g.undoScale();
}
}

uint8_t draw_state = 0;

void draw(void) {
  u8g_prepare();
  switch(draw_state >> 3) {
    case 0: u8g_box_frame(draw_state&7); break;
    case 1: u8g_disc_circle(draw_state&7); break;
    case 2: u8g_r_frame(draw_state&7); break;
    case 3: u8g_string(draw_state&7); break;
    case 4: u8g_line(draw_state&7); break;
    case 5: u8g_triangle(draw_state&7); break;
    case 6: u8g_ascii_1(); break;
    case 7: u8g_ascii_2(); break;
    case 8: u8g_extra_page(draw_state&7); break;
  }
}

void setup(void) {

  // flip screen, if required
  //u8g.setRot180();

  #if defined(ARDUINO)
  pinMode(13, OUTPUT);
  digitalWrite(13, HIGH);
  #endif
}

void loop(void) {
  // picture loop
  u8g.firstPage();
  do {

```

```
draw();
} while( u8g.nextPage() );

// increase the state
draw_state++;
if ( draw_state >= 9*8 )
    draw_state = 0;

// rebuild the picture after some delay
//delay(150);

}
```

## 8. More Information

Please refer to the WPI438 product page on [www.velleman.eu](http://www.velleman.eu) for more information.

**Use this device with original accessories only. Velleman nv cannot be held responsible in the event of damage or injury resulting from (incorrect) use of this device. For more info concerning this product and the latest version of this manual, please visit our website [www.velleman.eu](http://www.velleman.eu). The information in this manual is subject to change without prior notice.**

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