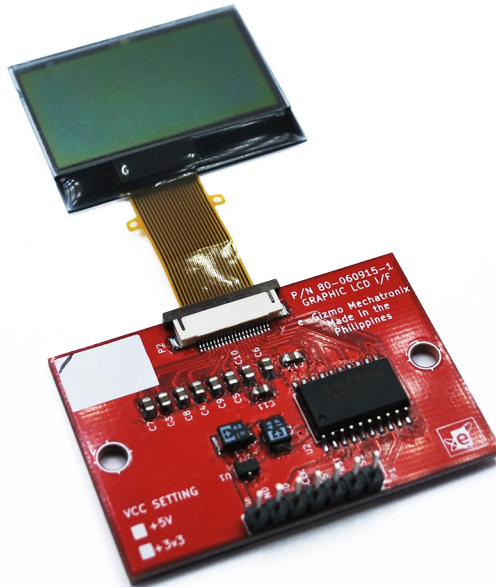


Graphic LCD I/F

Technical Manual Rev 1r0



The e-Gizmo Graphic LCD I/F the display is a film compensated STN (super-twisted nematic display) a type of monochrome passive matrix liquid crystal display. SPI Interface communication.

FEATURES:

- Gizduino (Arduino Compatible)
- AVR compatible*
- Monochrome, grayscale
- Well-defined interface to the device
- With Graphical User Interface library(GUI)

GENERAL SPECIFICATIONS:

- Input Supply: +5V DC
- IC: LV244A
- COM Interface: Software SPI, Hardware SPI, 8Bit parallel
- LCD Module: TM10656CIWG1
- LCD Operation Voltage: $V_{dd} = 3.0V$
- Dot Matrix: 106 Columns x 56 Rows
- Dot Size: 0.27 x 0.27(mm)
- Dot Pitch: 0.29 x 0.29(mm)
- Weight: 20g
- Operating Temperature: -20 to + 70 degrees C
- Polarizer mode: Transflective/Positive
- Display Color: Black
- Background: No Background
- LCD Dimensions: 22mm x 36mm
- PCB Dimensions: 50 mm x 34 mm

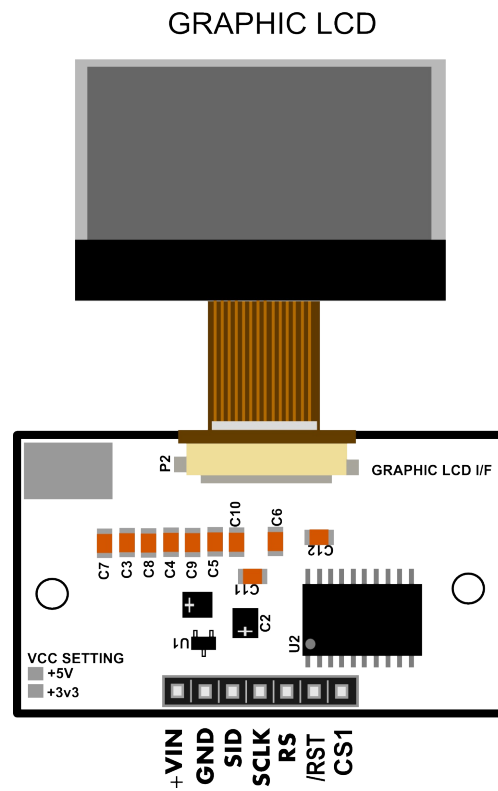


Figure 1. Major Parts placement of Graphic LCD I/F

Table 1. SPI Communication pin descriptions

PIN NAME	DESCRIPTIONS
+VIN	+5V Input Supply
GND	Ground
SID	MOSI
SCLK	SCK
RS	A0
/RST	RST
CS1	CS

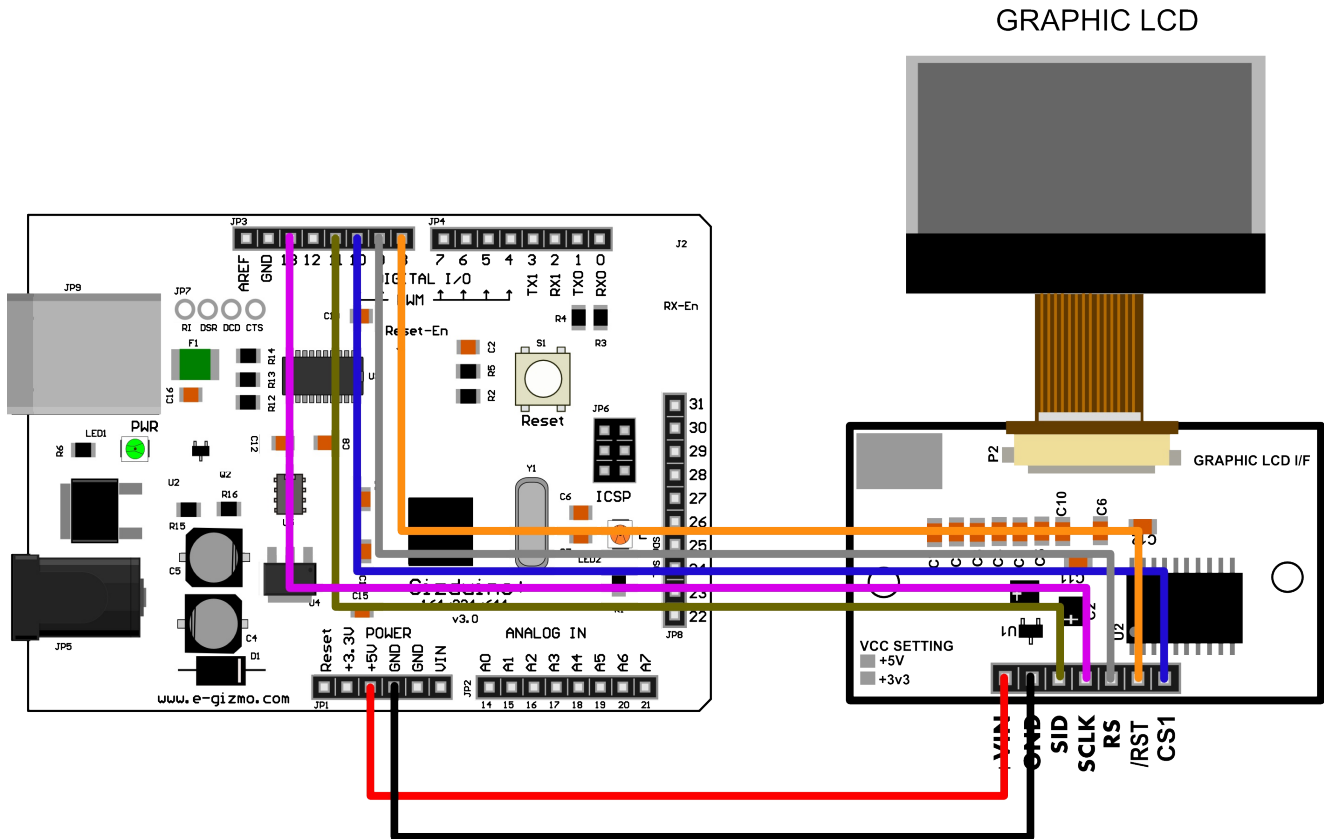


Figure 2. Graphic LCD I/F connected to a Gizduino microcontroller

To connect the Graphic LCD I/F to the Gizduino microcontroller:

- connect the red wire to +VIN(5V) to the +5V power from the microcontroller.
- connect the black wire to the ground.
- connect the green wire to the SID of the Graphic LCD I/F to Pin11 microcontroller.
- connect the violet wire to the SCLK of the Graphic LCD I/F to Pin13 microcontroller.
- connect the gray wire to the RS of the Graphic LCD I/F to Pin9 microcontroller.
- connect the orange wire to the /RST of the Graphic LCD I/F to Pin8 microcontroller.
- connect the gray wire to the CS1 of the Graphic LCD I/F to Pin10 microcontroller.

Example 1. `u8g.setPrintPos(21, 19);`

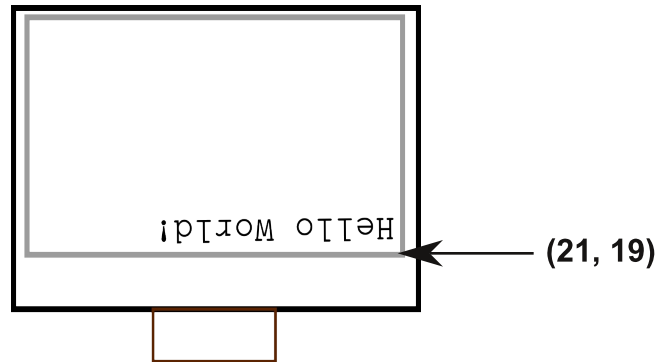


Figure 3. Unflip screen illustration

Example 2. `u8g.setPrintPos(0, 11);`

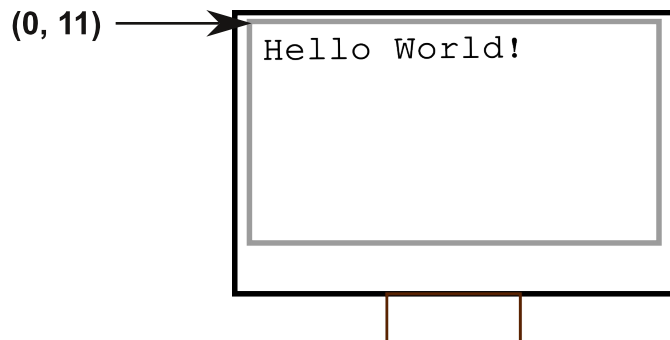


Figure 4. Flip screen illustration

Reference Manual:
https://code.google.com/p/u8glib/wiki/userreference#User_Reference_Manual

KEYWORDS	DESCRIPTIONS
prepare	
cbeginsetPrintPos	
updates	
write	
/* Screen Rotation*/	
undoRotation	//prev rotation
setRot90	//90degrees rotation setting
setRot180	//180degrees rotation setting
setRot270	//270degrees rotation setting
/* Screen scaling*/	
undoScale	//previous scale
setScale2x2	//double scale size setting
/* picture loop*/	
firstpage	//view first page
nextpage	//view next page
/* system commands */	
setContrast	//contrast settings
sleepOn	
sleepOff	
/* graphic primitives */	
setColorEntry*	*for colored LCD only
setHiColor*	
setHiColorByRGB*	
setRGB*	
setColorIndex*	
getColorIndex*	
setDefaultForegroundColor*	
setDefaultBackgroundColor*	
setDefaultMidColor*	
getWidth	
getHeight	
getMode	
drawPixel	
drawHLine	//draw horizontal line
drawVLine	//draw vertical line
drawLine	//draw line
drawFrame	//draw frame
drawRFrame	

```

drawBox          //drawbox
drawRBox
drawCircle      //draw a circle
drawDisc        //draw a disc
drawEllipse     //draw a ellipse
drawFilledEllipse //draw a filled ellipse
drawTriangle    //draw a triangle
    
```

/* bitmap handling */

```

drawBitmap      //draw a bitmap
drawBitmapP
drawXBM
drawXBMP
    
```

/* font handling */

```

setFont        //Font setting
getFontAscent  //Font Ascent
getFontDescent //Font Descent
getFontLineSpacing //Font Line Spacing

drawStr        //draw or display the string value
drawStr90     //set the String value in 90 degrees
drawStr180    //set the String value in 180 degrees
drawStr270    //set the String value in 270 degrees
drawStrP
drawStr90P
drawStr180P
drawStr270P
setFontPosBaseline //set Font position at the baseline
setFontPosBottom  //set Font position at the bottom
setFontPosCenter  //set Font position at the center
setFontPosTop     //set Font position at the top
setFontRefHeightText
setFontRefHeightExtendedText
setFontRefHeightAll
setFontLineSpacingFactor

getStrPixelWidth
getStrPixelWidthP
getStrWidth
getStrWidthP
    
```

/* cursor handling */

```

setCursorFont    //set the cursor font
setCursorStyle   //set the cursor style
setCursorPos     //set the cursor position
    
```

/* e-Gizmo Graphic LCD I/F

Hello World sample code

This program is for e-gizmo Graphic LCD I/F to display text message on the LCD.

Wire Connections

- Gizduino+644P - Graphic LCD
- POWER +5V - VIN
- GND - GND
- SCK D13 - SCLK
- MOSI D11 - SID
- CS D10 - CS1
- RST D08 - /RST
- A0 D09 - RS

Modified by e-Gizmo Mechatronix Central
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```

*/
//Universal GLCD library
#include "U8glib.h"
//Pin assignment
    
```

```

U8GLIB_NHD_C12864 u8g(13, 11, 10, 9, 8); // SPI Com: SCK = 13, MOSI = 11, CS = 10, A0 = 9, RST = 8 *
void draw(void) {
  // graphic commands to redraw the complete screen should be placed here
  u8g.setFont(u8g_font_unifont);
  //non-flip origin pos
  u8g.setPrintPos(21, 19);
  //flip origin pos
  //u8g.setPrintPos(0,11);
  // call procedure from base class, http://arduino.cc/en/Serial/Print
  u8g.print("Hello World!");
}
void setup(void) {
  // flip screen, if required
  // u8g.setRot180();
}
void loop(void) {
  // picture loop
  u8g.firstPage();
  do {
    draw();
  } while( u8g.nextPage() );

  // rebuild the picture after some delay
  delay(500);
}
    
```

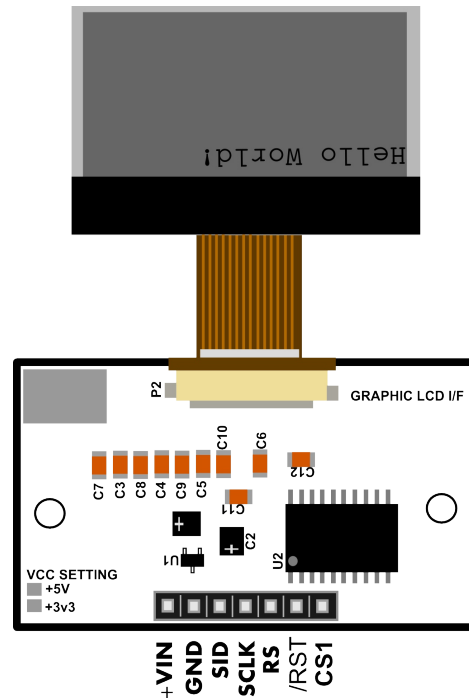


Figure 5. Graphic LCD I/F Sample Output Result.