ITDB02_Graph - Arduino library support for 8bit QVGA LCD Boards

Basic functionality of this library are based on the demo-code provided by ITead studio. You can find the latest version of the library at http://www.henningkarlsen.com/electronics

This library was originally especially for the 2.4" TFT LCD Screen Module: ITDB02-2.4 by ITead studio, but has later been expanded to support multiple modules. This library has been designed to use 8bit mode, so it will not work with 16bit modules.

Supported controllers:
- ILI9325C
- ILI9325D

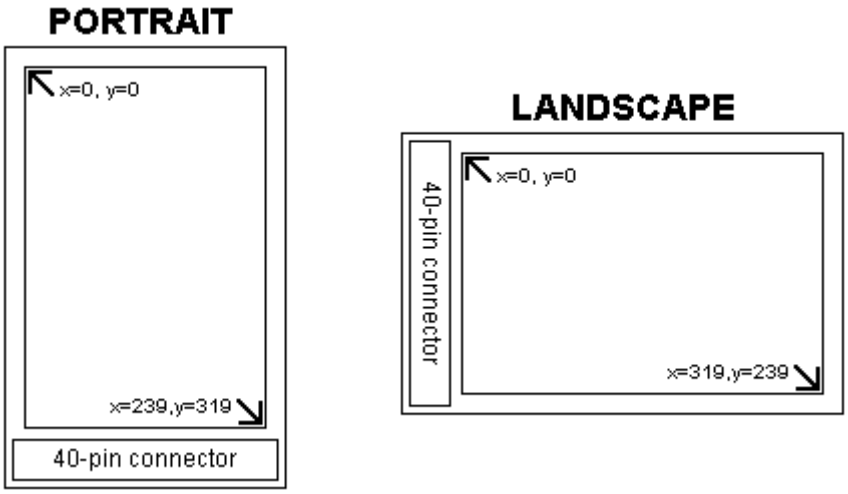
If you make any modifications or improvements to the code, I would appreciate that you share the code with me so that I might include it in the next release. I can be contacted through http://www.henningkarlsen.com/electronics/contact.php

Version:	1.0	10 Jul 2010	• initial release
	1.01	11 Aug 2010	• Fixed a small bug with the color green. Thanks to Thomas finding and fixing the bug.
	2.0	13 Aug 2010	• Added the possibility to use the display in Landscape mode. Also added a larger font by request.
	2.1	30 Sep 2010	• Added Arduino Mega compatibility • Fixed a bug with CENTER and RIGHT in LANDSCAPE mode • Fixed a bug in printNumI and printNumF when the number to be printed was 0
	2.2	14 Oct 2010	• Added drawBitmap() with its associated tool
	2.3	24 Nov 2010	• Added Arduino Mega2560 compatibility • Added support for rotating text and bitmaps.
	2.4	18 Jan 2011	• Fixed an error in the requirements
	2.5	30 Jan 2011	• Added loadBitmap() • Optimized drawBitmap() when not using rotation
	2.6	04 Mar 2011	• Fixed a bug in printNumF when the number to be printed was (-)0.something
	3.0	19 Mar 2011	• General optimization
	3.01	20 Mar 2011	• Reduced memory footprint slightly
	4.0	27 Mar 2011	• Remade the font-system to make it more flexible
	4.01	17 Apr 2011	• Added ITDB02-2.4D compatibility • Further reduced memory footprint
	4.1	19 Apr 2011	• Remade the tinyFAT integration. Moved loadBitmap() to the ITDB02_tinyFAT library
	4.2	22 Aug 2011	• Added support for more displaymodules

IMPORTANT:
If you are upgrading from a version below v4.0 you have to delete the old library before unpacking v4.0+

INTEGRATION WITH tinyFAT:
tinyFAT integration has been moved to a separate library. Please use the ITDB02_tinyFAT library to enable integration.

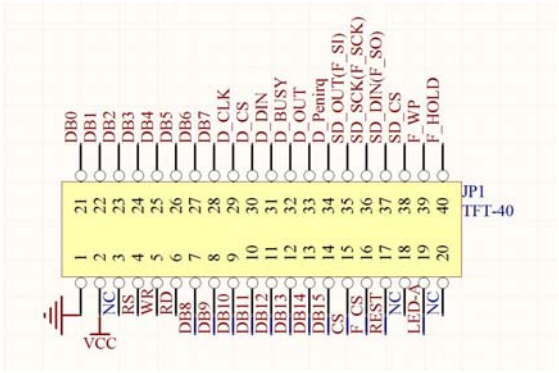
DISPLAY ORIENTATION:



Requirements:

The library require the following connections:

Signal	ITDB02 pin	Arduino pin*	Arduino Mega pin
DB8	7	D0	D22
DB9	8	D1	D23
DB10	9	D2	D24
DB11	10	D3	D25
DB12	11	D4	D26
DB13	12	D5	D27
DB14	13	D6	D28
DB15	14	D7	D29



ITDB02 pinout

* All boards with pinout like the Arduino Duemilanove / Arduino UNO

Defined Literals:

Alignment

For use with print(), printNumI() and printNumF()

LEFT:	0
RIGHT:	9999
CENTER:	9998

Orientation

For use with InitLCD()

PORTRAIT:	0
LANDSCAPE:	1

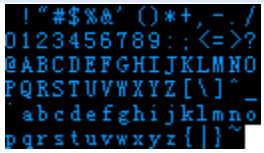
Display Model

For use with ITDB02()

ITDB24:	0
ITDB24D:	1
TFT01_24:	1

Included Fonts:

SmallFont



Charactersize: 8x12 pixels
Number of characters: 95

BigFont

Charactersize: 16x16 pixels
Number of characters: 95

SevenSegNumFont

Charactersize: 32x50 pixels
Number of characters: 10

Functions:

ITDB02(RS, WR, CS, RST[, Model]);

The main class of the interface.

```
Parameters:     RS:    Arduino pin for Register Select
                WR:    Arduino pin for Write
                CS:    Arduino pin for Chip Select
                RST:   Arduino pin for Reset
                Model: <optional>
                       See the separate document for the supported display modules
Usage:          ITDB02 myGLCD(19,18,17,16); // Start an instance of the ITDB02 class
```

InitLCD([orientation]);

Initialize the LCD and set display orientation.

```
Parameters:     Orientation: <optional>
                             PORTRAIT (default)
                             LANDSCAPE
Usage:          myGLCD.initLCD(); // Initialize the display
Notes:          This will reset color to white with black background.
```

clrScr();

Clear the screen. The background-color will be set to black.

```
Parameters:     None
Usage:          myGLCD.clrScr(); // Clear the screen
```

fillScr(r, g, b);

Fill the screen with a specified color.

```
Parameters:     r: Red component of an RGB value (0-255)
                g: Green component of an RGB value (0-255)
                b: Blue component of an RGB value (0-255)
Usage:          myGLCD.fillScr(255,127,0); // Fill the screen with orange
```

setColor(r, g, b);

Set the color to use for all draw*, fill* and print commands.

```
Parameters:     r: Red component of an RGB value (0-255)
                g: Green component of an RGB value (0-255)
                b: Blue component of an RGB value (0-255)
Usage:          myGLCD.setColor(0,255,255); // Set the color to cyan
```

setBackColor(r, g, b);

Set the background color to use for all print commands.

```
Parameters:     r: Red component of an RGB value (0-255)
                g: Green component of an RGB value (0-255)
                b: Blue component of an RGB value (0-255)
Usage:          myGLCD.setBackColor(255,255,255); // Set the background color to white
```

drawPixel(x, y);

Draw a single pixel.

```
Parameters:     x: x-coordinate of the pixel
                y: y-coordinate of the pixel
Usage:          myGLCD.drawPixel(119,159); // Draw a single pixel at the center of the screen
```

drawLine(x1, y1, x2, y2);

Draw a line between two points.

```
Parameters:     x1: x-coordinate of the start-point
                y1: y-coordinate of the start-point
                x2: x-coordinate of the end-point
                y2: y-coordinate of the end-point
Usage:          myGLCD.drawLine(0,0,239,319); // Draw a line from the upper left to the lower right corner
```

drawRect(x1, y1, x2, y2);

Draw a rectangle between two points.

Parameters:
```
x1: x-coordinate of the start-corner
y1: y-coordinate of the start-corner
x2: x-coordinate of the end-corner
y2: y-coordinate of the end-corner
```
Usage:
```
myGLCD.drawRect(119,159,239,319); // Draw a rectangle in the lower right corner of the screen
```

drawRoundRect(x1, y1, x2, y2);

Draw a rectangle with slightly rounded corners between two points. The minimum size is 5 pixels in both directions. If a smaller size is requested the rectangle will not be drawn.

Parameters:
```
x1: x-coordinate of the start-corner
y1: y-coordinate of the start-corner
x2: x-coordinate of the end-corner
y2: y-coordinate of the end-corner
```
Usage:
```
myGLCD.drawRoundRect(0,0,119,159); // Draw a rounded rectangle in the upper left corner of the screen
```

fillRect(x1, y1, x2, y2);

Draw a filled rectangle between two points.

Parameters:
```
x1: x-coordinate of the start-corner
y1: y-coordinate of the start-corner
x2: x-coordinate of the end-corner
y2: y-coordinate of the end-corner
```
Usage:
```
myGLCD.fillRect(119,0,239,159); // Draw a filled rectangle in the upper right corner of the screen
```

fillRoundRect(x1, y1, x2, y2);

Draw a filled rectangle with slightly rounded corners between two points. The minimum size is 5 pixels in both directions. If a smaller size is requested the rectangle will not be drawn.

Parameters:
```
x1: x-coordinate of the start-corner
y1: y-coordinate of the start-corner
x2: x-coordinate of the end-corner
y2: y-coordinate of the end-corner
```
Usage:
```
myGLCD.fillRoundRect(0,159,119,319); // Draw a filled, rounded rectangle in the lower left corner of the screen
```

drawCircle(x, y, radius);

Draw a circle with a specified radius.

Parameters:
```
x:      x-coordinate of the center of the circle
y:      y-coordinate of the center of the circle
radius: radius of the circle in pixels
```
Usage:
```
myGLCD.drawCircle(119,159,20); // Draw a circle in the middle of the screen with a radius of 20 pixels
```

fillCircle(x, y, radius);

Draw a filled circle with a specified radius.

Parameters:
```
x:      x-coordinate of the center of the circle
y:      y-coordinate of the center of the circle
radius: radius of the circle in pixels
```
Usage:
```
myGLCD.fillCircle(119,159,10); // Draw a filled circle in the middle of the screen with a radius of 10 pixels
```

print(st, x, y[, deg]);

Print a string at the specified coordinates. An optional background color can be specified. Default background is black.
You can use the literals LEFT, CENTER and RIGHT as the x-coordinate to align the string on the screen.

Parameters:
```
st:  the string to print
x:   x-coordinate of the upper, left corner of the first character
y:   y-coordinate of the upper, left corner of the first character
deg: <optional>
     Degrees to rotate text (0-359). Text will be rotated around the upper left corner.
```
Usage:
```
myGLCD.print("Hello, World!",CENTER,0); // Print "Hello, World!" centered at the top of the screen
```
Notes:
```
CENTER and RIGHT will not calculate the coordinates correctly when rotating text.
```

printNumI(num, x, y);

Print an integer number at the specified coordinates. An optional background color can be specified. Default background is black.
You can use the literals LEFT, CENTER and RIGHT as the x-coordinate to align the string on the screen.

Parameters:
```
num: the value to print (-2,147,483,648 to 2,147,483,647) INTEGERS ONLY
x:   x-coordinate of the upper, left corner of the first digit/sign
y:   y-coordinate of the upper, left corner of the first digit/sign
```
Usage:
```
myGLCD.print(num,CENTER,0); // Print the value of "num" centered at the top of the screen
```

printNumF(num, dec, x, y);

Print a floating-point number at the specified coordinates. An optional background color can be specified. Default background is black.
You can use the literals LEFT, CENTER and RIGHT as the x-coordinate to align the string on the screen.
WARNING: Floating point numbers are not exact, and may yield strange results when compared. Use at your own discretion.

Parameters:
```
num: the value to print (See note)
dec: digits in the fractional part (1-5) 0 is not supported. Use printNumI() instead.
x:   x-coordinate of the upper, left corner of the first digit/sign
y:   y-coordinate of the upper, left corner of the first digit/sign
```
Usage:
```
myGLCD.print(num, 3, CENTER,0); // Print the value of "num" with 3 fractional digits top centered
```
Notes:
```
Supported range depends on the number of fractional digits used.
Approx range is +/- 2*(10^(9-dec))
```

setFont(fontname);

Select font to use with print(), printNumI() and printNumF().

Parameters:
```
fontname: Name of the array containing the font you wish to use
```
Usage:
```
myGLCD.setFont(BigFont); // Select the font called BigFont
```
Notes:
```
You must declare the font-array as an external or include it in your sketch.
```

drawBitmap (x, y, sx, sy, data[, scale]);

Draw a bitmap on the screen.

Parameters:
```
x:     x-coordinate of the upper, left corner of the bitmap
y:     y-coordinate of the upper, left corner of the bitmap
sx:    width of the bitmap in pixels
sy:    height of the bitmap in pixels
data:  array containing the bitmap-data
scale: <optional>
       Scaling factor. Each pixel in the bitmap will be drawn as <scale>x<scale> pixels on screen.
```
Usage:
```
myGLCD.drawBitmap(0, 0, 32, 32, bitmap); // Draw a 32x32 pixel bitmap in the upper left corner
```
Notes:
```
You can use the online-tool "ImageConverter 565" or "ImageConverter565.exe" in the Tools-folder to
convert pictures into compatible arrays. The online-tool can be found on my website.
Requires that you #include <avr/pgmspace.h>
```

drawBitmap (x, y, sx, sy, data, deg, rox, roy);

Draw a bitmap on the screen with rotation.

Parameters:
```
x:    x-coordinate of the upper, left corner of the bitmap
y:    y-coordinate of the upper, left corner of the bitmap
sx:   width of the bitmap in pixels
sy:   height of the bitmap in pixels
data: array containing the bitmap-data
deg:  Degrees to rotate bitmap (0-359)
rox:  x-coordinate of the pixel to use as rotational center relative to bitmaps upper left corner
roy:  y-coordinate of the pixel to use as rotational center relative to bitmaps upper left corner
```
Usage:
```
myGLCD.drawBitmap(50, 50, 32, 32, bitmap, 45, 16, 16); // Draw a bitmap rotated 45 degrees around its
center
```
Notes:
```
You can use the online-tool "ImageConverter 565" or "ImageConverter565.exe" in the Tools-folder to
convert pictures into compatible arrays. The online-tool can be found on my website.
Requires that you #include <avr/pgmspace.h>
```