LCD5110_Graph - Arduino library support for Nokia 5110 compatible LCDs

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 has been made to make it easy to use the Nokia 5110 LCD module as a graphics display on an Arduino.

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	01 Sep 2011	• initial release

Defined Literals:

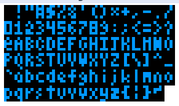
Alignment

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

LEFT:	0
RIGHT:	9999
CENTER:	9998

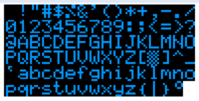
Included Fonts:

TinyFont



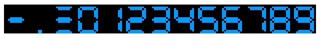
Charactersize:	4x6 pixels
Number of characters:	95

SmallFont



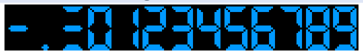
Charactersize:	6x8 pixels
Number of characters:	95

MediumNumbers



Charactersize:	12x16 pixels
Number of characters:	13

BigNumbers



Charactersize:	14x24 pixels
Number of characters:	13

Functions:

LCD5110(SCK, MOSI, DC, RST, CS);

Class constructor.

Parameters:	`SCK:    Arduino pin for Clock signal`
	`MOSI:   Arduino pin for Data transfer`
	`DC:     Arduino pin for Register Select (Data/Command)`
	`RST:    Arduino pin for Reset`
	`CS:     Arduino pin for Chip Select`
Usage:	`LCD5110 myGLCD(8, 9, 10, 11, 12); // Start an instance of the LCD5110 class`

InitLCD();

Initialize the LCD.

Parameters:	`None`
Usage:	`myGLCD.initLCD(); // Initialize the display`
Notes:	`This will reset and clear the display.`

update();

Copy the screen buffer to the screen.
This is the only command, except invert(), that will make anything happen on the physical screen. All other commands only modify the screen buffer.

Parameters:	`None`
Usage:	`myGLCD.update(); // Copy the screen buffer to the screen`
Notes:	`Remember to call update() after you have updated the screen buffer.`

clrScr();

Clear the screen buffer.

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

invert(mode);

Set inversion of the display on or off.

Parameters:	`mode: true  - Invert the display`
	`      false – Normal display`
Usage:	`myGLCD.invert(true); // Set display inversion on`

setPixel(x, y);

Turn on the specified pixel in the screen buffer.

Parameters:	`x:  x-coordinate of the pixel`
	`y:  y-coordinate of the pixel`
Usage:	`myGLCD.setPixel(0, 0); // Turn on the upper left pixel (in the screen buffer)`

clrPixel(x, y);

Turn off the specified pixel in the screen buffer.

Parameters:	`x:  x-coordinate of the pixel`
	`y:  y-coordinate of the pixel`
Usage:	`myGLCD.clrPixel(0, 0); // Turn off the upper left pixel (in the screen buffer)`

invPixel(x, y);

Invert the state of the specified pixel in the screen buffer.

Parameters:	`x:  x-coordinate of the pixel`
	`y:  y-coordinate of the pixel`
Usage:	`myGLCD.invPixel(0, 0); // Invert the upper left pixel (in the screen buffer)`

print(st, x, y);

Print a string at the specified coordinates in the screen buffer.
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`

Usage:	`myGLCD.print("Hello World",CENTER,0); // Print "Hello World" centered at the top of the screen (in the screen buffer)`

printNumI(num, x, y);

Print an integer number at the specified coordinates in the screen buffer.
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 (in the screen buffer)`

printNumF(num, dec, x, y);

Print a floating-point number at the specified coordinates in the screen buffer.
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 (0-239)`
	`y:   y-coordinate of the upper, left corner of the first digit/sign (0-319)`

Usage:	`myGLCD.print(num, 3, CENTER,0); // Print the value of "num" with 3 fractional digits top centered (in the screen buffer)`

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(SmallFont); // Select the font called SmallFont`
Notes:	`You must declare the font-array as an external or include it in your sketch.`

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

Draw a bitmap in the screen buffer.

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`
	`flash: <optional>`
	`       true  - data-array is in flash memory (Default)`
	`       false – data-array is in RAM`

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 5110*" to convert pictures into compatible arrays. The online-tool can be found on my website. Requires that you #include <avr/pgmspace.h> While the bitmap data *MUST* be a multiple of 8 pixels high you do not need to display all the rows. Example: If the bitmap is 24 pixels high and you specify sy=20 only the upper 20 rows will be displayed.

drawLine(x1, y1, x2, y2);

Draw a line between two points in the screen buffer.

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(0,0,83,47); // Draw a line from the upper left to the lower right corner`

drawRect(x1, y1, x2, y2);

Draw a rectangle between two points in the screen buffer.

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(42,24,83,47); // 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 in the screen buffer.
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(0,0,41,23); // Draw a rounded rectangle in the upper left corner of the screen`

drawCircle(x, y, radius);

Draw a circle with a specified radius in the screen buffer.

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(41,23,20); // Draw a circle in the middle of the screen with a radius of 20 pixels`