# LCD5110_Basic

**Arduino and chipKit library for Nokia 5110 compatible LCDs**

# Manual

## PREFACE:

This library has been made to make it easy to use the basic functions of the Nokia 5110 LCD module on an Arduino or a chipKit.

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**

You can always find the latest version of the library at **http://electronics.henningkarlsen.com/**

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://electronics.henningkarlsen.com/contact.php**.

For version information, please refer to **version.txt**.

## Defined Literals:

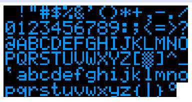
**Alignment**

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

| | |
|---|---|
| LEFT: | 0 |
| RIGHT: | 9999 |
| CENTER: | 9998 |

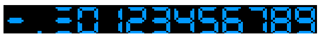
## Included Fonts:

**SmallFont**



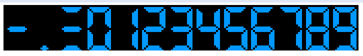
| | |
|---|---|
| Charactersize: | 6x8 pixels |
| Number of characters: | 95 |

**MediumNumbers**



| | |
|---|---|
| Charactersize: | 12x16 pixels |
| Number of characters: | 13 |

**BigNumbers**



| | |
|---|---|
| Charactersize: | 14x24 pixels |
| Number of characters: | 13 |

## Functions:

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

The main class constructor.

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

**InitLCD([contrast]);**

Initialize the LCD.

Parameters:
```
contrast:  <optional>
           Specify a value to use for contrast (0-127)
           Default is 70
```
Usage:
```
myGLCD.initLCD(); // Initialize the display
```
Notes: This will reset and clear the display.

**setContrast(contrast);**

Set the contrast of the LCD.

Parameters:
```
contrast:  Specify a value to use for contrast (0-127)
```
Usage:
```
myGLCD.setContrast(70); // Sets the contrast to the default value of 70
```

**clrScr();**

Clear the screen.

Parameters: None

Usage:
```
myGLCD.clrScr(); // Clear the screen
```

**clrRow(row[, start_x[, end_x]]);**

Clear a part of, or a whole row.

Parameters:
```
row:     8 pixel high row to clear (0-5)
start_x: <optional>
         x-coordinate to start the clearing on (default = 0)
end_x:   <optional>
         x-coordinate to end the clearing on (default = 83)
```
Usage:
```
myGLCD.clrRow(5, 42); // Clear the right half of the lower row
```

**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
```

## print(st, x, y);

Print a string at the specified coordinates.
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
```
Notes:
```
The y-coordinate will be adjusted to be aligned with an 8 pixel high display row.
In effect only 0, 8, 16, 24, 32 and 40 can be used as y-coordinates.
The string can be either a char array or a String object
```

## printNumI(num, x, y[, length[, filler]]);

Print an integer number at the specified coordinates.
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
length: <optional>
        minimum number of digits/characters (including sign) to display
filler: <optional>
        filler character to use to get the minimum length. The character will be inserted in front
        of the number, but after the sign. Default is ' ' (space).
```
Usage:
```
myGLCD.print(num,CENTER,0); // Print the value of “num” centered at the top of the screen
```
Notes:
```
The y-coordinate will be adjusted to be aligned with an 8 pixel high display row.
In effect only 0, 8, 16, 24, 32 and 40 can be used as y-coordinates.
```

## printNumF(num, dec, x, y[, divider[, length[, filler]]]);

Print a floating-point number at the specified coordinates.
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
divider:  <Optional>
          Single character to use as decimal point. Default is '.'
length:   <optional>
          minimum number of digits/characters (including sign) to display
filler:   <optional>
          filler character to use to get the minimum length. The character will be inserted in front
          of the number, but after the sign. Default is ' ' (space).
```
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))
The y-coordinate will be adjusted to be aligned with an 8 pixel high display row.
In effect only 0, 8, 16, 24, 32 and 40 can be used as y-coordinates.
```

## 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.
```

## invertText(mode);

Select if text printed with print(), printNumI() and printNumF() should be inverted.

Parameters:
```
mode: true  - Invert the text
      false – Normal text
```
Usage:
```
myGLCD.invertText(true); // Turn on inverted printing
```
Notes:
```
SetFont() will turn off inverted printing
```

## drawBitmap (x, y, sx, sy, data);

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
```
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 Mono” to convert pictures into compatible arrays.
The online-tool can be found on my website.
Requires that you #include <avr/pgmspace.h> when using an Arduino other than Arduino Due.
```