

AlphaLCD helper for Arduino
1.0.4

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Chapter 1

Hierarchical Index

1.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

- AlphaLCD
- LCD 7

Chapter 2

Class Index

2.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

LCD	Manages the Alphanumeric display for program output messages	7
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Chapter 3

File Index

3.1 File List

Here is a list of all files with brief descriptions:

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Chapter 4

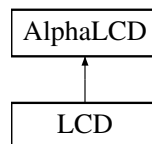
Class Documentation

4.1 LCD Class Reference

Manages the Alphanumeric display for program output messages.

```
#include "LCD.h"
```

Inheritance diagram for LCD:



Public Member Functions

- `LCD ()`
- `~LCD ()`
- void `enable` (bool s)
Set the display on or off.
- void `blink` (bool set)
Set blink mode.
- void `error` (String m)
shows an error message
- void `error` (String m, int x, int y)
shows an error message at specified coordinates
- void `message` (String m)
shows a string message
- void `message` (String m, int x, int y)
shows a string message at specified coordinates
- void `clean` ()
clean the LCD screen
- void `dec` (int n)
shows an integer in decimal format
- void `hex` (int n)
shows an integer in hexadecimal format
- void `bin` (int n)
shows an integer in binary format

- void `oct` (int *n*)
shows an integer in octal format
- void `welcome` ()
shows the program welcome message
- void `menu` (String *sect1*, String *sect2*, String *sect3*, String *sect4*)

Private Member Functions

- `LCD` (const `LCD` &*c*)
- `LCD` & `operator=` (const `LCD` &*c*)

Private Attributes

- AlphaLCD `lcd`
AlphaLCD class inherited instance.

4.1.1 Detailed Description

Manages the Alphanumeric display for program output messages.

This class implements the *AlphaLCD* class that manages the Alphanumeric `LCD` display hardware using three digital Arduino pins via a shift-out register.

Definition at line 56 of file `LCD.h`.

4.1.2 Constructor & Destructor Documentation

4.1.2.1 `LCD::LCD` ()

4.1.2.2 `LCD::~~LCD` ()

4.1.2.3 `LCD::LCD` (const `LCD` & *c*) [private]

4.1.3 Member Function Documentation

4.1.3.1 void `LCD::bin` (int *n*)

shows an integer in binary format

4.1.3.2 void `LCD::blink` (bool *set*)

Set blink mode.

4.1.3.3 void `LCD::clean` ()

clean the `LCD` screen

4.1.3.4 void `LCD::dec` (int *n*)

shows an integer in decimal format

4.1.3.5 void LCD::enable (bool *s*)

Set the display on or off.

4.1.3.6 void LCD::error (String *m*)

shows an error message

4.1.3.7 void LCD::error (String *m*, int *x*, int *y*)

shows an error message at specified coordinates

4.1.3.8 void LCD::hex (int *n*)

shows an integer in hexadecimal format

4.1.3.9 void LCD::menu (String *sect1*, String *sect2*, String *sect3*, String *sect4*)

4.1.3.10 void LCD::message (String *m*)

shows a string message

4.1.3.11 void LCD::message (String *m*, int *x*, int *y*)

shows a string message at specified coordinates

4.1.3.12 void LCD::oct (int *n*)

shows an integer in octal format

4.1.3.13 LCD& LCD::operator=(const LCD & *c*) [private]

4.1.3.14 void LCD::welcome ()

shows the program welcome message

4.1.4 Member Data Documentation

4.1.4.1 AlphaLCD LCD::lcd [private]

AlphaLCD class inherited instance.

Definition at line 61 of file LCD.h.

The documentation for this class was generated from the following file:

- /Volumes/John Doe/Firmware/Arduino Sketches and components/Display/Display_Example/LCD.h

Chapter 5

File Documentation

5.1 /Volumes/John Doe/Firmware/Arduino Sketches and components/Display/Display_Example/Display_Example.ino File Reference

```
#include <AlphaLCD.h>
#include <Streaming.h>
#include "LCD.h"
#include "Strings.h"
#include "Version.h"
```

Functions

- AlphaLCD `lcd` (2, 3, 4)
AlphaLCD class instance for display hardware control.
- void `setup` ()
- void `loop` (void)
- void `welcome` ()
Welcome message shown at device power-on.
- void `message` (String m)
Display a string on the LCD at the cursor position.
- void `dec` (int n)
Display an integer value in decimal format at the cursor position.
- void `hex` (int n)
Display an integer value in hex format at the cursor position.
- void `error` (String m, int x, int y)
Display an error message at the specified cursor coordinates.
- void `error` (String m)
Display an error message at the cursor position.
- void `message` (String m, int x, int y)
Display a string on the LCD at the specified cursor coordinates.
- void `clean` ()
Clean the display.
- void `menu` (String sect1, String sect2, String sect3, String sect4)
Creates a menu screen.

5.1.1 Function Documentation

5.1.1.1 void clean ()

Clean the display.

A delay of 100 ms is added after the hardware clear() call to give the display the time to complete the operation.

Definition at line 135 of file Display_Example.ino.

References lcd(), and LCDCLEAR_DELAY.

Referenced by menu().

```
135         {
136     lcd.clear();
137     delay(LCDCLEAR_DELAY);
138 }
```

5.1.1.2 void dec (int n)

Display an integer value in decimal format at the cursor position.

Parameters

<i>n</i>	the integer to show in decimal format
----------	---------------------------------------

Definition at line 71 of file Display_Example.ino.

References lcd().

```
71         {
72     lcd.print(n, DEC);
73 }
```

5.1.1.3 void error (String m, int x, int y)

Display an error message at the specified cursor coordinates.

The error message is shown for a LCDERROR_DELAY milliseconds. After the timeout expires the screen is not cleared so the next steps should be managed by the program flow. It is expected that error messages are shown in a calling code that manages the error conditions.

Parameters

<i>m</i>	the message string
<i>x</i>	the cursor column zero based
<i>y</i>	the row number zero based

Definition at line 97 of file Display_Example.ino.

References LCDERROR_DELAY, and message().

```
97         {
98     message(m, x, y);
99     delay(LCDERROR_DELAY);
100 }
```

5.1.1.4 void error (String m)

Display an error message at the cursor position.

The error message is shown for a LCDERROR_DELAY milliseconds. After the timeout expires the screen is not cleared so the next steps should be managed by the program flow. It is expected that error messages are shown in a calling code that manages the error conditions.

Parameters

<i>m</i>	the string message
----------	--------------------

Definition at line 112 of file Display_Example.ino.

References LCDERROR_DELAY, and message().

```
112         {
113     message(m);
114     delay(LCDERROR_DELAY);
115 }
```

5.1.1.5 void hex (int *n*)

Display an integer value in hex format at the cursor position.

Parameters

<i>n</i>	the integer to show in hexadecimal format
----------	-------------------------------------------

Definition at line 80 of file Display_Example.ino.

References lcd().

```
80         {
81     lcd.print("0x");
82     lcd.print(n, HEX);
83 }
```

5.1.1.6 AlphaLCD lcd (2, 3, 4)

AlphaLCD class instance for display hardware control.

Referenced by clean(), dec(), hex(), message(), setup(), and welcome().

5.1.1.7 void loop (void)

Definition at line 29 of file Display_Example.ino.

```
30 {
31
32     // ...
33
34 }
```

5.1.1.8 void menu (String *sect1*, String *sect2*, String *sect3*, String *sect4*)

Creates a menu screen.

The 2-lines LCD screen is divided in four sectors, that can be used or not. The LCD sectors length and position are defined and based on the LCD size. Every sector is filled with one of the four parameters string. Sectors 1 & 2 are in the top row, sectors 3 & 4 in the bottom row

Parameters

<i>sect1</i>	The Upper Left display sector
--------------	-------------------------------

<i>sect2</i>	The Upper Right display sector
<i>sect3</i>	The Lower Left display sector
<i>sect4</i>	The Lower Right display sector

Definition at line 153 of file Display_Example.ino.

References `clean()`, `LCD_SECTOR1`, `LCD_SECTOR2`, `LCD_SECTOR3`, `LCD_SECTOR4`, `LCDBOTTOMROW`, `LCDTOPROW`, and `message()`.

```

153                                     {
154   clean();
155   message(sect1, LCD_SECTOR1, LCDTOPROW);
156   message(sect2, LCD_SECTOR2, LCDTOPROW);
157   message(sect3, LCD_SECTOR3, LCDBOTTOMROW);
158   message(sect4, LCD_SECTOR4, LCDBOTTOMROW);
159 }
```

5.1.1.9 void message (String m)

Display a string on the [LCD](#) at the cursor position.

Parameters

<i>m</i>	the message string
----------	--------------------

Definition at line 62 of file Display_Example.ino.

References `lcd()`.

Referenced by `error()`, `menu()`, and `message()`.

```

62                                     {
63   lcd.print(m);
64 }
```

5.1.1.10 void message (String m, int x, int y)

Display a string on the [LCD](#) at the specified cursor coordinates.

Parameters

<i>m</i>	the string message
<i>x</i>	the cursor column zero based
<i>y</i>	the row number zero based

Definition at line 124 of file Display_Example.ino.

References `lcd()`, and `message()`.

```

124                                     {
125   lcd.setCursor(x, y);
126   message(m);
127 }
```

5.1.1.11 void setup ()

Definition at line 15 of file Display_Example.ino.

References `lcd()`, `LCDCHARS`, `LCDROWS`, and `welcome()`.

```

16 {
17
18   // Initializes the LCD library
19   lcd.begin(LCDCHARS, LCDROWS);
```

```
20
21 // Turn LCD On
22 lcd.display();
23
24 welcome();
25
26 }
```

5.1.1.12 void welcome ()

Welcome message shown at device power-on.

Definition at line 42 of file Display_Example.ino.

References `_SPACING`, `_VERSION`, `lcd()`, `LcdbOTTOMROW`, `LCDMESSAGE_DELAY`, `LCDDTOPROW`, and `version`.

Referenced by `setup()`.

```
42         {
43
44     lcd.clear();
45     lcd.setCursor(0, LCDDTOPROW);
46     lcd << "Electrosch...";
47     delay(LCDMESSAGE_DELAY);
48     lcd.clear();
49
50     lcd.setCursor(0, LcdbOTTOMROW);
51     lcd << _VERSION << _SPACING << version();
52     delay(LCDMESSAGE_DELAY);
53     lcd.clear();
54
55 }
```

5.2 /Volumes/John Doe/Firmware/Arduino Sketches and components/Display/Display_Example/LCD.h File Reference

LCD display Manager include file.

```
#include <inttypes.h>
#include <Print.h>
#include <AlphaLCD.h>
#include <Streaming.h>
```

Classes

- class [LCD](#)
Manages the Alphanumeric display for program output messages.

Macros

- #define [LCDclockPin](#) 2
LCD Shift control pin - Clock signal Define this value accordingly with the Arduino board connections.
- #define [LCDlatchPin](#) 3
LCD Shift control pin - Latch signal Define this value accordingly with the Arduino board connections.
- #define [LCDdataPin](#) 4
LCD Shift control pin - Data signal Define this value accordingly with the Arduino board connections.
- #define [LCDCHARS](#) 16
Display characters per line Define this value accordingly with the [LCD](#) Hardware datasheet.

- `#define LCDROWS 2`
Display rows.
- `#define LCDTOPROW 0`
The top row number of the LCD.
- `#define LCDBOTTOMROW 1`
The bottom row number of the LCD.
- `#define LCD_SECTOR1 0`
Top Left display sector column.
- `#define LCD_SECTOR2 LCDCHARS / 2`
Top Right display sector column.
- `#define LCD_SECTOR3 0`
Bottom Left display sector column.
- `#define LCD_SECTOR4 LCDCHARS / 2`
Bottom Right display sector column.
- `#define LCDERROR_DELAY 3000`
Delay after showing an error.
- `#define LCDMESSAGE_DELAY 2000`
Delay after showing a temporary message e.g. the welcome screen.
- `#define LCDCLEAR_DELAY 100`
Delay after a clear display call to hardware has been done.

5.2.1 Detailed Description

LCD display Manager include file. Methods to manage the LCD output and display features, including some hard-coded strings like the welcome message.

Definition in file [LCD.h](#).

5.2.2 Macro Definition Documentation

5.2.2.1 `#define LCD_SECTOR1 0`

Top Left display sector column.

Definition at line 35 of file [LCD.h](#).

Referenced by [menu\(\)](#).

5.2.2.2 `#define LCD_SECTOR2 LCDCHARS / 2`

Top Right display sector column.

Definition at line 37 of file [LCD.h](#).

Referenced by [menu\(\)](#).

5.2.2.3 `#define LCD_SECTOR3 0`

Bottom Left display sector column.

Definition at line 39 of file [LCD.h](#).

Referenced by [menu\(\)](#).

5.2.2.4 `#define LCD_SECTOR4 LCDCHARS / 2`

Bottom Right display sector column.

Definition at line 41 of file LCD.h.

Referenced by `menu()`.

5.2.2.5 `#define LCDBOTTOMROW 1`

The bottom row number of the [LCD](#).

Definition at line 33 of file LCD.h.

Referenced by `menu()`, and `welcome()`.

5.2.2.6 `#define LCDCHARS 16`

Display characters per line Define this value accordingly with the [LCD](#) Hardware datasheet.

Definition at line 27 of file LCD.h.

Referenced by `setup()`.

5.2.2.7 `#define LCDCLEAR_DELAY 100`

Delay after a clear display call to hardware has been done.

Definition at line 48 of file LCD.h.

Referenced by `clean()`.

5.2.2.8 `#define LCDclockPin 2`

[LCD](#) Shift control pin - Clock signal Define this value accordingly with the Arduino board connections.

Definition at line 18 of file LCD.h.

5.2.2.9 `#define LCDdataPin 4`

[LCD](#) Shift control pin - Data signal Define this value accordingly with the Arduino board connections.

Definition at line 24 of file LCD.h.

5.2.2.10 `#define LCDERROR_DELAY 3000`

Delay after showing an error.

Definition at line 44 of file LCD.h.

Referenced by `error()`.

5.2.2.11 `#define LCDlatchPin 3`

[LCD](#) Shift control pin - Latch signal Define this value accordingly with the Arduino board connections.

Definition at line 21 of file LCD.h.

5.2.2.12 #define LCDMESSAGE_DELAY 2000

Delay after showing a temporary message e.g. the welcome screen.

Definition at line 46 of file LCD.h.

Referenced by welcome().

5.2.2.13 #define LCDROWS 2

Display rows.

Definition at line 29 of file LCD.h.

Referenced by setup().

5.2.2.14 #define LCDTOPROW 0

The top row number of the LCD.

Definition at line 31 of file LCD.h.

Referenced by menu(), and welcome().

5.3 /Volumes/John Doe/Firmware/Arduino Sketches and components/Display/Display_Example/Strings.h File Reference

LCD Display base strings.

```
#include "Version.h"
```

Macros

- #define `_SPACING` " "
- #define `_EMPTY_HALF_LINE` " "
 - Half text line empty (based on 20 character lines LCD)*
- #define `_VERSION` "V"
- #define `_DIRECT_PHOTO` "Photo"
 - Direct function: Shoot a photo.*
- #define `_DIRECT_FOCUS` "Focus"
 - Direct function: Setup auto focus on the Camera.*
- #define `_DIRECT_BURST` "Burst"
 - Direct function: Burst a manual sequence.*
- #define `_MAIN_MESSAGE` "'Info' last action"
- #define `_MENU_MESSAGE` "'Down' for items"
- #define `_READY_MESSAGE` "Select any option"
- #define `_STANDBY_TIT` "Standby"
 - Standby status.*
- #define `_CHOICE_TIT` "Ready"
 - Choice from the menu or waiting for action.*
- #define `_RUNNING_TIT` "Running"
 - Function running.*
- #define `_PAUSED_TIT` "Paused"
 - Function paused.*

5.3.1 Detailed Description

[LCD](#) Display base strings. The strings used to build the board interface.

Definition in file [Strings.h](#).

5.3.2 Macro Definition Documentation

5.3.2.1 `#define _CHOICE_TIT "Ready"`

Choice from the menu or waiting for action.

Definition at line 27 of file [Strings.h](#).

5.3.2.2 `#define _DIRECT_BURST "Burst"`

Direct function: Burst a manual sequence.

Definition at line 20 of file [Strings.h](#).

5.3.2.3 `#define _DIRECT_FOCUS "Focus"`

Direct function: Setup auto focus on the Camera.

Definition at line 19 of file [Strings.h](#).

5.3.2.4 `#define _DIRECT_PHOTO "Photo"`

Direct function: Shoot a photo.

Definition at line 18 of file [Strings.h](#).

5.3.2.5 `#define _EMPTY_HALF_LINE " "`

Half text line empty (based on 20 character lines [LCD](#))

Definition at line 14 of file [Strings.h](#).

5.3.2.6 `#define _MAIN_MESSAGE "'Info' last action"`

Definition at line 22 of file [Strings.h](#).

5.3.2.7 `#define _MENU_MESSAGE "'Down' for items"`

Definition at line 23 of file [Strings.h](#).

5.3.2.8 `#define _PAUSED_TIT "Paused"`

Function paused.

Definition at line 29 of file [Strings.h](#).

5.3.2.9 `#define _READY_MESSAGE "Select any option"`

Definition at line 24 of file [Strings.h](#).

5.3.2.10 `#define _RUNNING_TIT "Running"`

Function running.

Definition at line 28 of file Strings.h.

5.3.2.11 `#define _SPACING " "`

Definition at line 13 of file Strings.h.

Referenced by `welcome()`.

5.3.2.12 `#define _STANDBY_TIT "Standby"`

Standby status.

Definition at line 26 of file Strings.h.

5.3.2.13 `#define _VERSION "V"`

Definition at line 16 of file Strings.h.

Referenced by `welcome()`.

5.4 /Volumes/John Doe/Firmware/Arduino Sketches and components/Display/Display_Example/Version.h File Reference

Version and Build NumberHelper Class.

Macros

- `#define build() "1.0.4 rc"`
Incremental build number.
- `#define version() "1.1"`
Firmware version.
- `#define project() "Electroschematics"`
Project name.

5.4.1 Detailed Description

Version and Build NumberHelper Class. This helper macros exposes the static methods to get the firmware version and the build number. Use the `build()` and `version()` methods anywhere in the program including this file

Definition in file [Version.h](#).

5.4.2 Macro Definition Documentation

5.4.2.1 `#define build() "1.0.4 rc"`

Incremental build number.

Definition at line 12 of file Version.h.

5.4.2.2 `#define project() "Electroschematics"`

Project name.

Definition at line 16 of file Version.h.

5.4.2.3 `#define version() "1.1"`

Firmware version.

Definition at line 14 of file Version.h.

Referenced by `welcome()`.

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