LCD_screen Library Suite for Pervasive Displays - Reference Manual

Generated by Doxygen 1.8.11

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Contents

Chapter 1

Pervasive Displays Ext Gen 2

Library for Pervasive Displays e-paper screens

Developed with embedXcode+

Author

Rei VILO
http://embeddedcomputing.weebly.com

Date

Jun 28, 2016

Version

107

See also

ReadMe.txt for references

Chapter 2

Hierarchical Index

2.1 Class Hierarchy

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

Chapter 3

Class Index

3.1 Class List

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

Chapter 4

File Index

4.1 File List

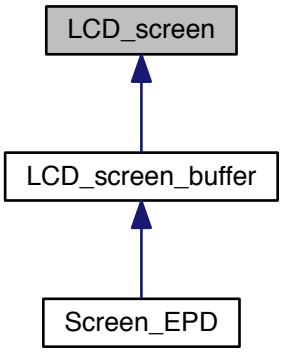
Here is a list of all documented files with brief descriptions:

Chapter 5

Class Documentation

5.1 LCD_screen Class Reference

Inheritance diagram for LCD_screen:



Public Member Functions

- virtual void **begin** ()=0
- virtual String **WhoAmI** ()=0
- void **clear** (uint16_t colour=blackColour)
- virtual void **setOrientation** (uint8_t orientation)
- uint8_t **getOrientation** ()
- virtual void **showInformation** (uint16_t x0=0, uint16_t y0=0)
- virtual uint16_t **screenSizeX** ()
- virtual uint16_t **screenSizeY** ()
- virtual void **circle** (uint16_t x0, uint16_t y0, uint16_t radius, uint16_t colour)
- virtual void **arc** (uint16_t x0, uint16_t y0, uint16_t radius, uint16_t start, uint16_t end, uint16_t colour)
- virtual void **line** (uint16_t x1, uint16_t y1, uint16_t x2, uint16_t y2, uint16_t colour)
- virtual void **dLine** (uint16_t x0, uint16_t y0, uint16_t dx, uint16_t dy, uint16_t colour)

- virtual void **setPenSolid** (bool flag=true)
- virtual void **triangle** (uint16_t x1, uint16_t y1, uint16_t x2, uint16_t y2, uint16_t x3, uint16_t y3, uint16_t colour)
- virtual void **rectangle** (uint16_t x1, uint16_t y1, uint16_t x2, uint16_t y2, uint16_t colour)
- virtual void **dRectangle** (uint16_t x0, uint16_t y0, uint16_t dx, uint16_t dy, uint16_t colour)
- virtual void **point** (uint16_t x1, uint16_t y1, uint16_t colour)
- virtual void **setFontSize** (uint8_t size)=0
- virtual void **setFontSolid** (bool flag=true)
- virtual uint8_t **fontSizeX** ()=0
- virtual uint8_t **fontSizeY** ()=0
- virtual void **gText** (uint16_t x0, uint16_t y0, String s, uint16_t textColour=whiteColour, uint16_t backColour=blackColour, uint8_t ix=1, uint8_t iy=1)=0
- uint16_t **calculateColour** (uint8_t red, uint8_t green, uint8_t blue)
- void **splitColour** (uint16_t rgb, uint8_t &red, uint8_t &green, uint8_t &blue)
- uint16_t **halveColour** (uint16_t rgb)
- uint16_t **averageColour** (uint16_t rgb1, uint16_t rgb2)
- uint16_t **reverseColour** (uint16_t rgb)
- bool **isReadable** ()
- bool **isStorage** ()
- virtual uint16_t **readPixel** (uint16_t x1, uint16_t y1)
- virtual void **copyPaste** (uint16_t x1, uint16_t y1, uint16_t x2, uint16_t y2, uint16_t dx, uint16_t dy)
- virtual void **copyArea** (uint16_t x0, uint16_t y0, uint16_t dx, uint16_t dy, uint32_t &address)
- virtual void **pasteArea** (uint16_t x0, uint16_t y0, uint16_t dx, uint16_t dy, uint32_t &address, bool option=false)
- bool **isTouch** ()
- bool **getTouch** (uint16_t &x, uint16_t &y, uint16_t &z)
- void **calibrateTouch** ()

Protected Member Functions

- virtual void **_fastFill** (uint16_t x1, uint16_t y1, uint16_t x2, uint16_t y2, uint16_t colour)=0
- virtual void **_setPoint** (uint16_t x1, uint16_t y1, uint16_t colour)=0
- virtual void **_getRawTouch** (uint16_t &x0, uint16_t &y0, uint16_t &z0)=0
- virtual void **_setWindow** (uint16_t x0, uint16_t y0, uint16_t x1, uint16_t y1)=0
- virtual void **_writeData88** (uint8_t dataHigh8, uint8_t dataLow8)=0
- void **_displayTarget** (uint16_t x0, uint16_t y0, uint16_t colour)
- void **_swap** (int16_t &a, int16_t &b)
- void **_swap** (uint16_t &a, uint16_t &b)
- void **_swap** (uint8_t &a, uint8_t &b)
- uint16_t **_check** (uint16_t x0, uint16_t xmin, uint16_t xmax)
- void **_triangleArea** (uint16_t x1, uint16_t y1, uint16_t x2, uint16_t y2, uint16_t x3, uint16_t y3, uint16_t colour)
- bool **_inValue** (int16_t value, int16_t valueLow, int16_t valueHigh)
- bool **_inSector** (int16_t valueStart, int16_t valueEnd, int16_t sectorLow, int16_t sectorHigh, int16_t criteriaStart, int16_t criteriaEnd, int16_t criteriaLow, int16_t criteriaHigh, int16_t criteria)
- bool **_inCycle** (int16_t value, int16_t valueLow, int16_t valueHigh)

Protected Attributes

- uint8_t **_fontX**
- uint8_t **_fontY**
- uint8_t **_fontSize**
- uint8_t **_orientation**
- bool **_penSolid**
- bool **_fontSolid**
- bool **_flagRead**
- bool **_flagStorage**
- uint16_t **_screenWidth**
- uint16_t **_screenHeigth**
- uint8_t **_touchTrim**
- uint16_t **_touchXmin**
- uint16_t **_touchXmax**
- uint16_t **_touchYmin**
- uint16_t **_touchYmax**

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

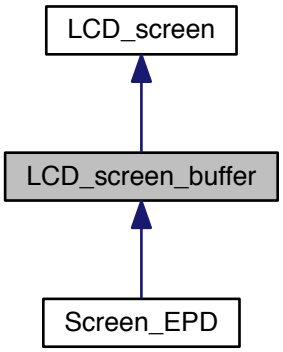
- LCD_screen.h
- LCD_screen.cpp

5.2 LCD_screen_buffer Class Reference

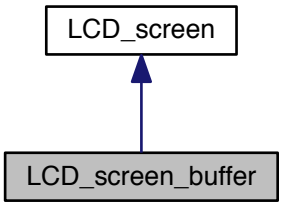
Generic class for LCD.

`#include <LCD_screen_buffer.h>`

Inheritance diagram for LCD_screen_buffer:



Collaboration diagram for LCD_screen_buffer:



Public Member Functions

- LCD_screen_buffer ()
  Constructor.

General

- void clear (uint16_t colour=blackColour)
  Clear the screen.

Graphics

- virtual void line (uint16_t x1, uint16_t y1, uint16_t x2, uint16_t y2, uint16_t colour)
  Draw line, rectangle coordinates.
- virtual void rectangle (uint16_t x1, uint16_t y1, uint16_t x2, uint16_t y2, uint16_t colour)
  Draw rectangle, rectangle coordinates.
- virtual void point (uint16_t x1, uint16_t y1, uint16_t colour)
  Draw pixel.

Text

- virtual void setFontSize (uint8_t size)
  Select font size.
- uint8_t getFontSize ()
  Get font size.
- virtual void setFontSolid (bool flag=true)
  Set transparent or opaque text.
- virtual uint8_t fontSizeX ()
  Font size, x-axis.
- virtual uint8_t fontSizeY ()
  Font size, y-axis.
- virtual void gText (uint16_t x0, uint16_t y0, String s, uint16_t textColour=blackColour, uint16_t back↩ Colour=whiteColour, uint8_t ix=1, uint8_t iy=1)
  Draw ASCII Text (pixel coordinates) with selection of size.

Protected Member Functions

- virtual void **_setOrientation** (uint8_t orientation)=0
- virtual void **_orientCoordinates** (uint16_t &x1, uint16_t &y1)=0
- void **_setWindow** (uint16_t x0, uint16_t y0, uint16_t x1, uint16_t y1)
- void **_closeWindow** ()
- virtual void **_setPoint** (uint16_t x1, uint16_t y1, uint16_t colour)=0
- void **_fastFill** (uint16_t x1, uint16_t y1, uint16_t x2, uint16_t y2, uint16_t colour)
- void **_writeData88** (uint8_t dataHigh8, uint8_t dataLow8)
- void **_getRawTouch** (uint16_t &x0, uint16_t &y0, uint16_t &z0)
- void **_triangleArea** (uint16_t x1, uint16_t y1, uint16_t x2, uint16_t y2, uint16_t x3, uint16_t y3, uint16_t colour)
- uint8_t **_getCharacter** (uint8_t c, uint8_t i)
- void **_setIntensity** (uint8_t intensity)
- void **_setBacklight** (bool flag)
- void **_swap** (int16_t &a, int16_t &b)
- void **_swap** (uint16_t &a, uint16_t &b)
- void **_swap** (uint8_t &a, uint8_t &b)
- uint16_t **_check** (uint16_t x0, uint16_t xmin, uint16_t xmax)

Protected Attributes

- uint32_t **_msEnergy**
- uint32_t **_chronoEnergy**
- bool **_stateEnergy**
- bool **_flagIntensity**

5.2.1 Detailed Description

Generic class for LCD.

5.2.2 Member Function Documentation

5.2.2.1 uint8_t LCD_screen_buffer::fontSizeX ( ) [virtual]

Font size, x-axis.

Returns

horizontal size of current font, in pixels

Implements LCD_screen.

5.2.2.2 uint8_t LCD_screen_buffer::fontSizeY ( ) [virtual]

Font size, y-axis.

Returns

vertical size of current font, in pixels

Implements LCD_screen.

5.2.2.3 uint8_t LCD_screen_buffer::getFontSize ( )

Get font size.

Returns

font size, default = 0 = small, 1 = large

5.2.2.4 void LCD_screen_buffer::gText (uint16_t *x0*, uint16_t *y0*, String *s*, uint16_t *textColour* = `blackColour`, uint16_t *backColour* = `whiteColour`, uint8_t *ix* = `1`, uint8_t *iy* = `1`) [virtual]

Draw ASCII Text (pixel coordinates) with selection of size.

Parameters

x0	point coordinate, x-axis
y0	point coordinate, y-axis
s	text string
textColour	16-bit colour, default = black
backColour	16-bit colour, default = white
ix	x-axis font size multiplier, default = 1
iy	y-axis font size multiplier, default = 1

More: Colours

Implements LCD_screen.

5.2.2.5 void LCD_screen_buffer::line (uint16_t *x1*, uint16_t *y1*, uint16_t *x2*, uint16_t *y2*, uint16_t *colour*) [virtual]

Draw line, rectangle coordinates.

Parameters

x1	top left coordinate, x-axis
y1	top left coordinate, y-axis
x2	bottom right coordinate, x-axis
y2	bottom right coordinate, y-axis
colour	16-bit colour

Reimplemented from LCD_screen.

5.2.2.6 void LCD_screen_buffer::point (uint16_t *x1*, uint16_t *y1*, uint16_t *colour*) [virtual]

Draw pixel.

Parameters

x1	point coordinate, x-axis
y1	point coordinate, y-axis
colour	16-bit colour

More: Coordinates, Colours

Reimplemented from LCD_screen.

5.2.2.7 void LCD_screen_buffer::rectangle (uint16_t *x1*, uint16_t *y1*, uint16_t *x2*, uint16_t *y2*, uint16_t *colour*) [virtual]

Draw rectangle, rectangle coordinates.

Parameters

x1	top left coordinate, x-axis
y1	top left coordinate, y-axis
x2	bottom right coordinate, x-axis
y2	bottom right coordinate, y-axis
colour	16-bit colour

More: Coordinates, Colours

Reimplemented from LCD_screen.

5.2.2.8 void LCD_screen_buffer::setFontSize (uint8_t *size*) [virtual]

Select font size.

Parameters

size	default = 0 = small, 1 = large

Warning

Definition for this method is compulsory.

Implements LCD_screen.

5.2.2.9 void LCD_screen_buffer::setFontSolid (bool *flag* = true) [virtual]

Set transparent or opaque text.

Parameters

flag	default = 1 = opaque = solid, false = transparent

Warning

Definition for this method is compulsory.

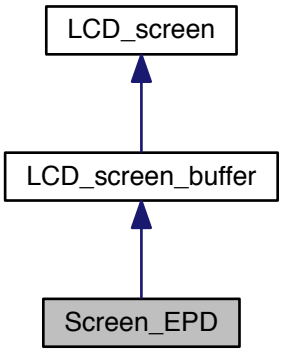
Reimplemented from LCD_screen.

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

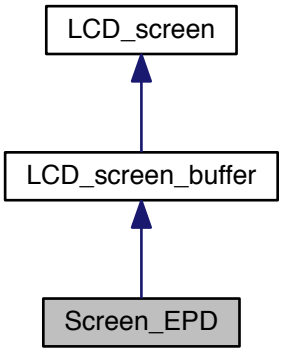
- LCD_screen_buffer.h
- LCD_screen_buffer.cpp

5.3 Screen_EPD Class Reference

Inheritance diagram for Screen_EPD:



Collaboration diagram for Screen_EPD:



Public Member Functions

- Screen_EPD (eScreen_EPD_t eScreen)
  Constructor with default pins.
- void begin ()
  Initialisation.
- String WhoAmI ()
  Request information about the screen.
- void clear (uint16_t colour=whiteColour)
  Clear the screen.
- void invert (boolean flag)
  Invert screen.
- void flush ()
  Display.
- uint8_t getResult ()
  Return last result code.

Additional Inherited Members

5.3.1 Member Function Documentation

5.3.1.1 void Screen_EPD::clear (uint16_t *colour* = `whiteColour`)

Clear the screen.

Parameters

colour	default=white

5.3.1.2 void Screen_EPD::invert (boolean *flag*)

Invert screen.

Parameters

flag	true to invert, false for normal screen

5.3.1.3 String Screen_EPD::WhoAml ( ) [virtual]

Request information about the screen.

Returns

string with hardware version

Implements LCD_screen.

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

- Screen_EPD.h
- Screen_EPD.cpp

Chapter 6

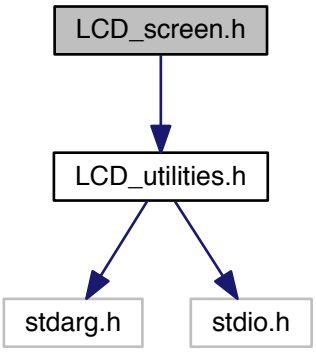
File Documentation

6.1 LCD_screen.h File Reference

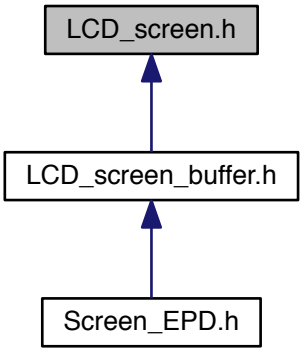
Class library header.

```
#include "LCD_utilities.h"
```

Include dependency graph for LCD_screen.h:



This graph shows which files directly or indirectly include this file:



Classes

- class LCD_screen

Macros

- #define **LCD_SCREEN_RELEASE** 114

Variables

- const uint16_t **blackColour** = 0b0000000000000000
- const uint16_t **whiteColour** = 0b1111111111111111
- const uint16_t **redColour** = 0b1111100000000000
- const uint16_t **greenColour** = 0b0000011111100000
- const uint16_t **blueColour** = 0b0000000000011111
- const uint16_t **yellowColour** = 0b1111111111100000
- const uint16_t **cyanColour** = 0b0000011111111111
- const uint16_t **orangeColour** = 0b1111101111100000
- const uint16_t **magentaColour** = 0b1111100000001111
- const uint16_t **violetColour** = 0b1111100000011111
- const uint16_t **grayColour** = 0b0111101111101111
- const uint16_t **greyColour** = 0b0111101111101111
- const uint16_t **darkGrayColour** = 0b0011100111100111

6.1.1 Detailed Description

Class library header.

Generic LCD class library

Project LCD_screen
Developed with embedXcode

Author

Rei VILO
embedXcode.weebly.com

Date

Dec 10, 2013

Copyright

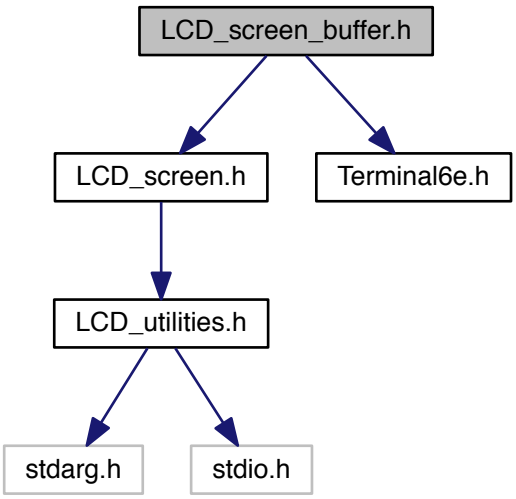
.txt for references

6.2 LCD_screen_buffer.h File Reference

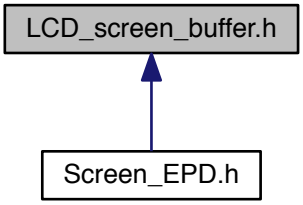
Class library header.

```
#include "LCD_screen.h"
#include "Terminal6e.h"
```

Include dependency graph for LCD_screen_buffer.h:



This graph shows which files directly or indirectly include this file:



Classes

- class LCD_screen_buffer

  Generic class for LCD.

Macros

- #define LCD_SCREEN_BUFFER_RELEASE 302

  Library release number.
- #define MAX_FONT_SIZE 1

  Biggest font size.

6.2.1 Detailed Description

Class library header.

Generic LCD with buffer class library

Project LCD_screen Library Suite
Developed with embedXcode

Author

Rei VILO
http://embedXcode.weebly.com

Date

Aug 03, 2016

Version

302

Copyright

See also

ReadMe.txt for references

6.2.2 Macro Definition Documentation

6.2.2.1 #define MAX_FONT_SIZE 1

Biggest font size.

Based on the MCU, by default=0

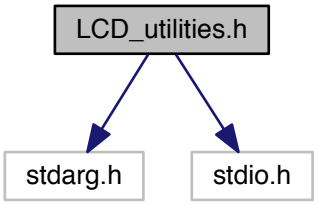
6.3 LCD_utilities.h File Reference

Library header for LCD_screen

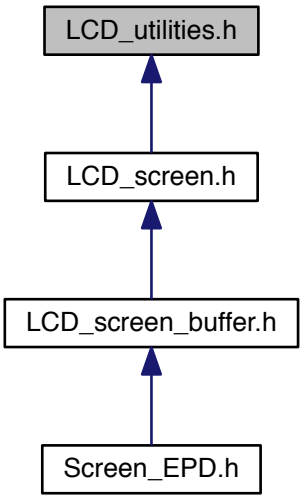
Project LCD_screen
Developed with embedXcode

```
#include "stdarg.h"
#include "stdio.h"
```

Include dependency graph for LCD_utilities.h:



This graph shows which files directly or indirectly include this file:



Macros

- #define **LCD_UTILITIES_RELEASE** 102

Functions

- int32_t **cos32x100** (int32_t degreesX100)
- int32_t **sin32x100** (int32_t degreesX100)
- String **utf2iso** (String s)
- String **htoa** (uint32_t number, uint8_t size=0)
- String **btoa** (uint16_t number, uint8_t size=8)
- String **ttoa** (uint32_t number, uint8_t size=0)
- String **i32toa** (int32_t number, int32_t unit=1, uint8_t decimal=0, uint8_t size=0)
- String **formatString** (const char *format,...)

6.3.1 Detailed Description

Library header for LCD_screen

Project LCD_screen
Developed with embedXcode

Author

Rei VILO
embedXcode.weebly.com

Date

Sep 18, 2013

Copyright

.txt for references

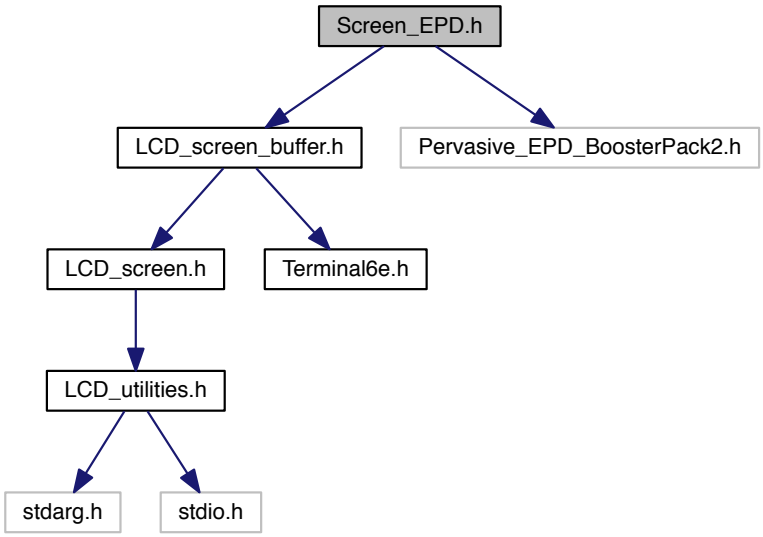
6.4 Screen_EPD.h File Reference

Library header

Project LCD_screen Library Suite
Developed with embedXcode

```
#include "LCD_screen_buffer.h"
#include "Pervasive_EPD_BoosterPack2.h"
```

Include dependency graph for Screen_EPD.h:



Classes

- class Screen_EPD

Macros

- #define Screen_EPD_RELEASE 107

  Library release number.

Enumerations

- enum eScreen_EPD_t {
  eScreen_EPD_eTC_144_Mb, eScreen_EPD_eTC_190_Mb, eScreen_EPD_eTC_200_Mb, eScreen_EPD_eTC_260_Mb,
  eScreen_EPD_eTC_271_Ma, eScreen_EPD_eTC_271_Mb, eScreen_EPD_iTC_215, eScreen_EPD_iTC_287,
  eScreen_EPD_iTC_420 }

  List of supported Persvasice Displays.

6.4.1 Detailed Description

Library header

Project LCD_screen Library Suite
Developed with embedXcode

- SPECIAL EDITION FOR ENERGIA

Author

Rei VILO
http://embeddedcomputing.weebly.com

Date

Sep 01, 2016

Version

108

Copyright

See also

ReadMe.txt for references

6.4.2 Enumeration Type Documentation

6.4.2.1 enum eScreen_EPD_t

List of supported Persvasice Displays.

Enumerator

eScreen_EPD_eTC_144_Mb	eScreen_EPD_eTC_144_Mb
eScreen_EPD_eTC_190_Mb	eScreen_EPD_eTC_190_Mb
eScreen_EPD_eTC_200_Mb	eScreen_EPD_eTC_200_Mb
eScreen_EPD_eTC_260_Mb	eScreen_EPD_eTC_260_Mb
eScreen_EPD_eTC_271_Ma	eScreen_EPD_eTC_271_Ma
eScreen_EPD_eTC_271_Mb	eScreen_EPD_eTC_271_Mb
eScreen_EPD_iTC_215	eScreen_EPD_iTC_215
eScreen_EPD_iTC_287	eScreen_EPD_iTC_287
eScreen_EPD_iTC_420	eScreen_EPD_iTC_420

6.5 Terminal12e.h File Reference

Extended font library Terminal 12 x 16

Developed with embedXcode
.

Macros

- #define **TERMINAL12E_FONT_RELEASE** 102

6.5.1 Detailed Description

Extended font library Terminal 12 x 16

Developed with embedXcode
.

Author

Rei VILO
http://embeddedcomputing.weebly.com

Date

May 26, 2012

Copyright

See also

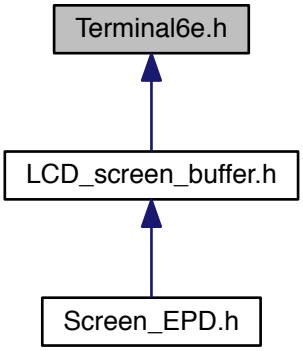
Font Generated by MikroElektronika GLCD Font Creator 1.2.0.0
MikroeElektronika 2011 http://www.mikroe.com

6.6 Terminal6e.h File Reference

Extended font library Terminal 6 x 8

Developed with embedXcode
.

This graph shows which files directly or indirectly include this file:



Macros

- #define **TERMINAL6E_FONT_RELEASE** 102

6.6.1 Detailed Description

Extended font library Terminal 6 x 8

Developed with embedXcode
.

Author

Rei VILO
http://embeddedcomputing.weebly.com

Date

May 26, 2012

Copyright

See also

Font Generated by MikroElektronika GLCD Font Creator 1.2.0.0
MikroeElektronika 2011 http://www.mikroe.com

6.7 Terminal8e.h File Reference

Extended font library Terminal 8 x 12

Developed with embedXcode
.

Macros

- #define **TERMINAL8E_FONT_RELEASE** 102

6.7.1 Detailed Description

Extended font library Terminal 8 x 12

Developed with embedXcode
.

Author

Rei VILO
http://embeddedcomputing.weebly.com

Date

May 26, 2012

Copyright

See also

Font Generated by MikroElektronika GLCD Font Creator 1.2.0.0
MikroeElektronika 2011 http://www.mikroe.com

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