

POLITECHNIKA ŚLĄSKA WYDZIAŁ AUTOMATYKI, ELEKTRONIKI I INFORMATYKI KIERUNEK TELEINFORMATYKA

Programowanie mikrokontrolerów ARM w języku C/C++

Biblioteka do obsługi wyświetlacza OLED ze sterownikiem SH1106

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1 Hierarchical Index

1.1 Class Hierarchy

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2.1 Class List	
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MonochromeView::DynamicStorageView< WIDTH, HEIGHT >	17
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DisplayComm::Factory Factory for display communication layer	24
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3 File Index	
3.1 File List	
Here is a list of all documented files with brief descriptions:	
DisplayApp/App/DisplayComm/Inc/DisplayComm/DisplayCommIf.hpp	35

4 Class Documentation

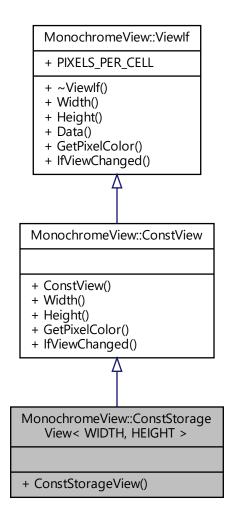
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4 Class Documentation

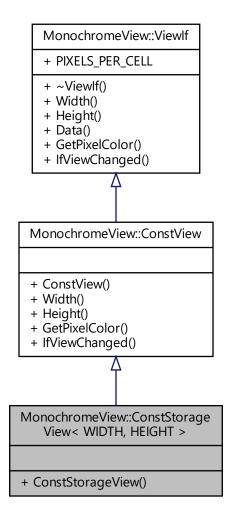
4.1 MonochromeView::ConstStorageView < WIDTH, HEIGHT > Class Template Reference

#include <ConstStorageView.hpp>

 $Inheritance\ diagram\ for\ Monochrome View:: ConstStorage View < WIDTH,\ HEIGHT >:$



Collaboration diagram for MonochromeView::ConstStorageView< WIDTH, HEIGHT >:



Public Member Functions

template<typename... ViewBytesTypes>
 ConstStorageView (ViewBytesTypes... viewBytes)

Additional Inherited Members

4.1.1 Detailed Description

 $\label{template} \mbox{template} < \mbox{size_t WIDTH, size_t HEIGHT} > \\ \mbox{class MonochromeView::} \mbox{ConstStorageView} < \mbox{WIDTH, HEIGHT} > \\ \mbox{template} < \mbox{size_t WIDTH, HEIGHT} > \\ \mbox{template} < \mb$

Constant view with internal storage.

Template Parameters

WIDTH	Width of a view.
HEIGHT	Height of a view.

4.1.2 Constructor & Destructor Documentation

Construct a new constant storage view object.

Template Parameters

Parameters

viewBytes	List of bytes to store for a view. The first element is a left-top cell (1 column and 8 rows pixels).
	The first column is repeated for each next 'width' pixels.

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

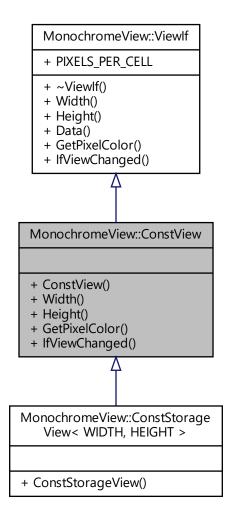
• DisplayApp/App/MonochromeView/Inc/MonochromeView/ConstStorageView.hpp

4.2 MonochromeView::ConstView Class Reference

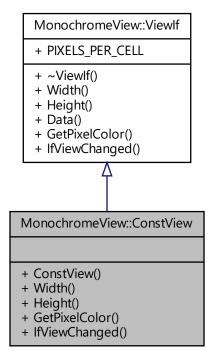
Constant view.

#include <ConstView.hpp>

Inheritance diagram for MonochromeView::ConstView:



Collaboration diagram for MonochromeView::ConstView:



Public Member Functions

- ConstView (const uint8_t *const pBuffer, const size_t width, const size_t height)
- size t Width () const override

Width of an view in pixels.

• size_t Height () const override

Height of an view in pixels.

- bool GetPixelColor (const size_t x, const size_t y) const override
- bool IfViewChanged () const

Additional Inherited Members

4.2.1 Detailed Description

Constant view.

4.2.2 Constructor & Destructor Documentation

Construct a new constant view object.

Parameters

pBuffer Pointer to the view data buffer. The first element is a left-top cell (1 column and 8 rows pixe		
	first column is repeated for each next 'width' pixels.	
width	Width of a view.	
height	Height of a view.	

4.2.3 Member Function Documentation

Get color of the pixel.

Parameters

Х	Horizontal coordinate.
У	Vertical coordinate.

Returns

Color of the pixel. [0 - black, 1 - default color].

Implements MonochromeView::ViewIf.

4.2.3.2 Height() size_t MonochromeView::ConstView::Height () const [override], [virtual]

Height of an view in pixels.

Implements MonochromeView::ViewIf.

4.2.3.3 IfViewChanged() bool MonochromeView::ConstView::IfViewChanged () const [virtual]

Implements MonochromeView::ViewIf.

4.2.3.4 Width() size_t MonochromeView::ConstView::Width () const [override], [virtual]

Width of an view in pixels.

Implements MonochromeView::ViewIf.

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

• DisplayApp/App/MonochromeView/Inc/MonochromeView/ConstView.hpp

4.3 DisplayComm::DisplayCommlf Class Reference

Interface for communication with display.

#include <DisplayCommIf.hpp>

Collaboration diagram for DisplayComm::DisplayCommlf:

DisplayComm::DisplayCommlf

+ ~DisplayCommlf()
+ WriteCmd()
+ WriteData()

Public Member Functions

- virtual bool WriteCmd (const uint8_t cmd) const =0
- virtual bool WriteData (const uint8_t *const pData, const size_t dataSize) const =0

4.3.1 Detailed Description

Interface for communication with display.

4.3.2 Member Function Documentation

```
4.3.2.1 WriteCmd() virtual bool DisplayComm::DisplayCommIf::WriteCmd ( const uint8_t cmd ) const [pure virtual]
```

Write command to the display.

Parameters

Returns

Write result.

```
4.3.2.2 WriteData() virtual bool DisplayComm::DisplayCommIf::WriteData ( const uint8_t *const pData, const size_t dataSize ) const [pure virtual]
```

Write data to the display.

Parameters

pData	Pointer to the data buffer.
dataSize	Data size in bytes.

Returns

Write result.

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

• DisplayApp/App/DisplayComm/Inc/DisplayComm/DisplayCommIf.hpp

4.4 DisplayComm::DisplayDataCmdlf Class Reference

Interface for changing mode of the display.

```
#include <DisplayDataCmdIf.hpp>
```

Collaboration diagram for DisplayComm::DisplayDataCmdIf:

DisplayComm::DisplayData CmdIf

- + ~DisplayDataCmdIf()
- + EnableCmdMode()
- + EnableDataMode()

Public Member Functions

- virtual void **EnableCmdMode** () const =0
 - Enable command mode in the display.
- virtual void **EnableDataMode** () const =0

Enable data mode in the display.

4.4.1 Detailed Description

Interface for changing mode of the display.

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

• DisplayApp/App/DisplayComm/Inc/DisplayComm/DisplayDataCmdlf.hpp

4.5 MonochromeGraphicDisplay::DisplayDriverIf Class Reference

Diver interface of graphical screens.

#include <DisplayDriverIf.hpp>

Collaboration diagram for MonochromeGraphicDisplay::DisplayDriverIf:

MonochromeGraphicDisplay ::DisplayDriverIf

- + ~DisplayDriverIf()
- + TurnOnDisplay()
- + TurnOffDisplay()
- + InverseColor()
- + SetContrast()
- + RefreshScreen()
- + GetView()
- + GetWidth()
- + GetHeight()

Public Member Functions

- virtual bool TurnOnDisplay ()=0
- virtual bool TurnOffDisplay ()=0
- virtual bool InverseColor (bool inverse)=0
- virtual bool SetContrast (uint8 t value)=0
- virtual bool RefreshScreen ()=0
- virtual MonochromeView::DynamicView & GetView ()=0
- virtual size_t GetWidth ()=0
- virtual size_t GetHeight ()=0

4.5.1 Detailed Description

Diver interface of graphical screens.

4.5.2 Member Function Documentation

```
4.5.2.1 GetHeight() virtual size_t MonochromeGraphicDisplay::DisplayDriverIf::GetHeight () [pure virtual]
```

Get the display height.

Returns

Height in pixels.

```
4.5.2.2 GetView() virtual MonochromeView::DynamicView & MonochromeGraphicDisplay::Display← DriverIf::GetView ( ) [pure virtual]
```

Get display view object.

Returns

Reference to display view object.

```
4.5.2.3 GetWidth() virtual size_t MonochromeGraphicDisplay::DisplayDriverIf::GetWidth ( ) [pure virtual]
```

Get the display width.

Returns

Width in pixels.

```
4.5.2.4 InverseColor() virtual bool MonochromeGraphicDisplay::DisplayDriverIf::InverseColor ( bool inverse) [pure virtual]
```

Inverse display colors.

(

Parameters
color [0 - normal, 1 - inversed]
Returns
Result.
4.5.2.5 RefreshScreen() virtual bool MonochromeGraphicDisplay::DisplayDriverIf::RefreshScreen
) [pure virtual]
Refresh screen.
Returns
Result.
4.5.2.6 SetContrast() virtual bool MonochromeGraphicDisplay::DisplayDriverIf::SetContrast (uint8_t value) [pure virtual]
Set the contrast.
Parameters
value Contrast [0u255u].
Returns
Result.
4.5.2.7 TurnOffDisplay() virtual bool MonochromeGraphicDisplay::DisplayDriverIf::TurnOffDisplay() [pure virtual]
Turns off display.

Result.

Returns

4.5.2.8 TurnOnDisplay() virtual bool MonochromeGraphicDisplay::DisplayDriverIf::TurnOnDisplay () [pure virtual]

Turns on display.

Returns

Result.

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

DisplayApp/App/MonochromeGraphicDisplay/Inc/MonochromeGraphicDisplay/DisplayDriverIf.hpp

4.6 DisplayComm::DisplayResetIf Class Reference

Interface for the reseting display.

#include <DisplayResetIf.hpp>

Collaboration diagram for DisplayComm::DisplayResetIf:

DisplayComm::DisplayResetIf

- + ~DisplayResetIf()
- + Reset()

Public Member Functions

virtual void Reset () const =0
 Reset display.

4.6.1 Detailed Description

Interface for the reseting display.

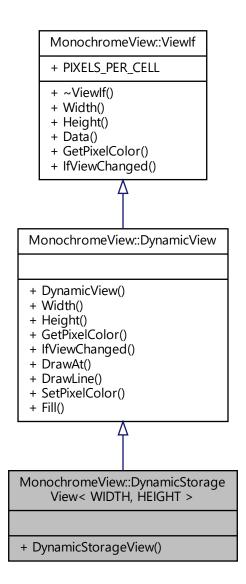
The documentation for this class was generated from the following file:

• DisplayApp/App/DisplayComm/Inc/DisplayComm/DisplayResetIf.hpp

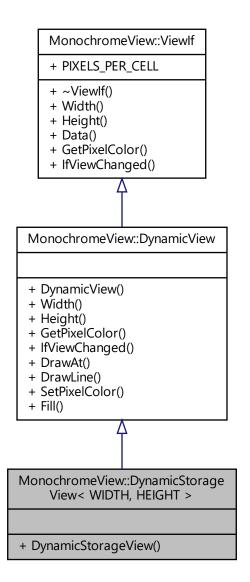
$\begin{tabular}{lll} 4.7 & Monochrome View:: Dynamic Storage View < WIDTH, HEIGHT > Class Template \\ & Reference \\ \end{tabular}$

#include <DynamicStorageView.hpp>

 $Inheritance\ diagram\ for\ Monochrome View:: Dynamic Storage View < WIDTH,\ HEIGHT >:$



Collaboration diagram for MonochromeView::DynamicStorageView < WIDTH, HEIGHT >:



Public Member Functions

template < typename... ViewBytesTypes >
 DynamicStorageView (ViewBytesTypes... viewBytes)

Additional Inherited Members

4.7.1 Detailed Description

 $\label{template} \mbox{template} < \mbox{size_t WIDTH, size_t HEIGHT} > \\ \mbox{class MonochromeView::DynamicStorageView} < \mbox{WIDTH, HEIGHT} > \\ \mbox{template} < \mbox{Template} < \mbox{WIDTH, HEIGHT} > \\ \mbox{template} < \mbox{Template} < \mbox{Template} < \mbox{WIDTH, HEIGHT} > \\ \mbox{template} < \mbox{Tem$

Dynamic view with internal storage.

Template Parameters

WIDTH	Width of a view.
HEIGHT	Height of a view.

4.7.2 Constructor & Destructor Documentation

Construct a new dynamic storage view object.

Template Parameters

Parameters

viewBytes	List of bytes to store for a view. The first element is a left-top cell (1 column and 8 rows pixels).
	The first column is repeated for each next 'width' pixels.

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

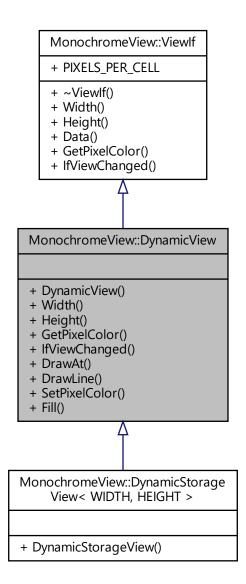
• DisplayApp/App/MonochromeView/Inc/MonochromeView/DynamicStorageView.hpp

4.8 MonochromeView::DynamicView Class Reference

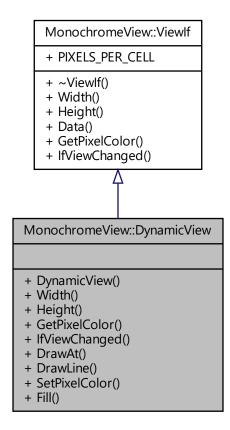
Dynamic view.

#include <DynamicView.hpp>

Inheritance diagram for MonochromeView::DynamicView:



Collaboration diagram for MonochromeView::DynamicView:



Public Member Functions

- DynamicView (uint8 t *const pBuffer, const size t width, const size t height)
- size_t Width () const override

Width of an view in pixels.

• size_t Height () const override

Height of an view in pixels.

- bool GetPixelColor (const size_t x, const size_t y) const override
- · bool IfViewChanged () const
- void DrawAt (const int32_t x, const int32_t y, const ViewIf &rAnotherView, const uint8_t drawOption=DRAW
 — OPT_NONE)
- void DrawLine (const int32_t x1, const int32_t y1, const int32_t x2, const int32_t y2, const bool color)
- void SetPixelColor (const size t x, const size t y, const bool color)
- · void Fill (const bool color)

Additional Inherited Members

4.8.1 Detailed Description

Dynamic view.

4.8.2 Constructor & Destructor Documentation

Construct a new constant view object.

Parameters

pBuffer	Pointer to the view data buffer. The first element is a left-top cell (1 column and 8 rows pixels). The first column is repeated for each next 'width' pixels.
width	Width of a view.
height	Height of a view.

4.8.3 Member Function Documentation

Draw at {x, y} another view.

Parameters

X	Horizontal coordinate.
У	Vertical coordinate.
rAnotherView	View to draw.
drawOption	Drawing option DRAW_OPT_TRANSPOSE or DRAW_OPT_X_MIRROR or
	DRAW_OPT_Y_MIRROR

Draw line between {x1, y1} and {x2, y2} points.

Parameters

x1	First point position in pixles, starting from left edge.
y1	First point position in pixles, starting from top edge.
x2	Second point position in pixles, starting from left edge.
y2	Second point position in pixles, starting from top edge.
color	[0 - black, 1 - default display color]

```
4.8.3.3 Fill() void MonochromeView::DynamicView::Fill ( const bool color )
```

Fill the whole view with a single color.

Parameters

```
color | Color to fill view. [0 - black, 1 - default color].
```

```
4.8.3.4 GetPixelColor() bool MonochromeView::DynamicView::GetPixelColor ( const size_t x, const size_t y ) const [override], [virtual]
```

Get color of the pixel.

Parameters

Х	Horizontal coordinate.
У	Vertical coordinate.

Returns

Color of the pixel. [0 - black, 1 - default color].

Implements MonochromeView::ViewIf.

```
4.8.3.5 Height() size_t MonochromeView::DynamicView::Height ( ) const [override], [virtual]
```

Height of an view in pixels.

Implements MonochromeView::ViewIf.

4.8.3.6 IfViewChanged() bool MonochromeView::DynamicView::IfViewChanged () const [virtual]

Implements MonochromeView::ViewIf.

Set color of a pixel at {x, y}.

Parameters

X	Horizontal coordinate.
У	Vertical coordinate.
color	Color of the pixel. [0 - black, 1 - default color].

4.8.3.8 Width() size_t MonochromeView::DynamicView::Width () const [override], [virtual]

Width of an view in pixels.

Implements MonochromeView::ViewIf.

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

• DisplayApp/App/MonochromeView/Inc/MonochromeView/DynamicView.hpp

4.9 DisplayComm::Factory Class Reference

Factory for display communication layer.

```
#include <Factory.hpp>
```

Collaboration diagram for DisplayComm::Factory:

DisplayComm::Factory

- + CreateDisplayReset()
- + CreateDataCmd()
- + CreateDisplayCommSpi()

Static Public Member Functions

- static DisplayResetIf * CreateDisplayReset (GPIO_TypeDef *const pResetPort, const uint32_t resetPin)
- static DisplayDataCmdlf * CreateDataCmd (GPIO_TypeDef *const pDcPort, const uint32_t dcPin)
- static DisplayCommIf * CreateDisplayCommSpi (SPI_TypeDef *const pSpi, GPIO_TypeDef *const pCsPort, const uint32_t csPin, const DisplayDataCmdIf *const pDataCmdIf)

4.9.1 Detailed Description

Factory for display communication layer.

4.9.2 Member Function Documentation

```
4.9.2.1 CreateDataCmd() static DisplayDataCmdIf * DisplayComm::Factory::CreateDataCmd (
GPIO_TypeDef *const pDcPort,
const uint32_t dcPin ) [static]
```

Create a data command driver object.

Parameters

pDcPort	Port of D/C pin.
dcPin	D/C pin number.

Note

User takes responsibility for managing lifetime of returned object!

Returns

DisplayResetIf* Pointer to a newly allocated D/C driver object.

Create a display comm object.

Parameters

pSpi	Pointer to the SPI interface.
pCsPort	Port of the chip select pin.
Generated by Doxygen Chip select pin.	
pData⊷	Pointer to data command interface.
CmdIf	

Note

User takes responsibility for managing lifetime of returned object!

Returns

DisplayCommlf* Pointer to a newly allocated communication driver object.

Create a display reset object.

Parameters

pResetPort	Port of the reset pin.
resetPin	Reset pin number.

Note

User takes responsibility for managing lifetime of returned object!

Returns

DisplayResetIf* Pointer to a newly allocated reset object.

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

• DisplayApp/App/DisplayComm/Inc/DisplayComm/Factory.hpp

4.10 Sh1106::Factory Class Reference

Factory of SH1106 dirvers.

#include <Factory.hpp>

Collaboration diagram for Sh1106::Factory:

Sh1106::Factory

- + Create128x32Driver()
- + Create128x64Driver()
- + Create128x128Driver()

Static Public Member Functions

- static MonochromeGraphicDisplay::DisplayDriverIf * Create128x32Driver (DisplayComm::DisplayCommIf *const pDisplayCommIf, DisplayComm::DisplayResetIf *const pDisplayResetIf, const bool mirror←
 Vertically=false, const bool mirrorHorizontally=false, const size_t columnOffset=0U)
- static MonochromeGraphicDisplay::DisplayDriverIf * Create128x64Driver (DisplayComm::DisplayCommIf *const pDisplayCommIf, DisplayComm::DisplayResetIf *const pDisplayResetIf, const bool mirror← Vertically=false, const bool mirrorHorizontally=false, const size_t columnOffset=0U)
- static MonochromeGraphicDisplay::DisplayDriverIf * Create128x128Driver (DisplayComm::DisplayCommlf *const pDisplayCommlf, DisplayComm::DisplayResetIf *const pDisplayResetIf, const bool mirror←
 Vertically=false, const bool mirrorHorizontally=false, const size_t columnOffset=0U)

4.10.1 Detailed Description

Factory of SH1106 dirvers.

4.10.2 Member Function Documentation

Create a SH1106 driver instance for resolution 128x128 px (width x height).

Parameters

pDisplayCommIf	Pointer to the display communication interface.
pDisplayResetIf	Pointer to the display reset interface.
mirrorVertically	Set to true to mirror vertically.
mirrorHorizontally	Set to false to mirror horizontally.
columnOffset	Offset of the first column.

Note

User takes responsibility for managing lifetime of returned object!

Returns

Pointer to a newly allocated SH1106 driver object.

Create a SH1106 driver instance for resolution 128x32 px (width x height).

Parameters

pDisplayCommIf	Pointer to the display communication interface.
pDisplayResetIf	Pointer to the display reset interface.
mirrorVertically	Set to true to mirror vertically.
mirrorHorizontally	Set to false to mirror horizontally.
columnOffset	Offset of the first column.

Note

User takes responsibility for managing lifetime of returned object!

Returns

Pointer to a newly allocated SH1106 driver object.

Create a SH1106 driver instance for resolution 128x64 px (width x height).

Parameters

pDisplayCommIf	Pointer to the display communication interface.
pDisplayResetIf	Pointer to the display reset interface.
mirrorVertically	Set to true to mirror vertically.
mirrorHorizontally	Set to false to mirror horizontally.
columnOffset	Offset of the first column.

Note

User takes responsibility for managing lifetime of returned object!

Returns

Pointer to a newly allocated SH1106 driver object.

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

• DisplayApp/App/Sh1106/Inc/Sh1106/Factory.hpp

4.11 MonochromeText::MonochromeFont Class Reference

Monochrome font.

```
#include <MonochromeFont.hpp>
```

Collaboration diagram for MonochromeText::MonochromeFont:

MonochromeText::MonochromeFont

- + MonochromeFont()
- + GetWidth()
- + GetHeight()
- + GetCharView()

Public Member Functions

- MonochromeFont (const uint8_t *const pCharsBytes, const size_t width, const size_t height, const size_t firstCharAsciiOffset, const size_t charsNum)
- uint8 t GetWidth () const
- uint8_t GetHeight () const
- MonochromeView::ConstView GetCharView (const char character) const

4.11.1 Detailed Description

Monochrome font.

4.11.2 Constructor & Destructor Documentation

Construct a new Monochrome Font object

Parameters

pCharsViews	Pointer to font characters bytes array. First element should has ASCII code.
width	Font width in pixels.
height	Font height in pixels.
firstCharAsciiOffset	Offset in ASCII table of the first character in font.
charsNum	Number of characters in font.

4.11.3 Member Function Documentation

4.11.3.1 GetCharView() MonochromeView::ConstView MonochromeText::MonochromeFont::GetCharView (const char *character*) const

Get character view.

Parameters

character	Character to get view of.
-----------	---------------------------

Returns

Character view.

4.11.3.2 GetHeight() uint8_t MonochromeText::MonochromeFont::GetHeight () const

Get the Height object

Returns

uint8_t Font height in pixels.

4.11.3.3 GetWidth() uint8_t MonochromeText::MonochromeFont::GetWidth () const

Get the Width object

Returns

uint8_t Font width in pixels.

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

• DisplayApp/App/MonochromeText/Inc/MonochromeText/MonochromeFont.hpp

4.12 MonochromeText::MonochromeText Class Reference

Monochrome text.

```
#include <MonochromeText.hpp>
```

Collaboration diagram for MonochromeText::MonochromeText:

MonochromeText::MonochromeText + WriteChar() + WriteString()

Static Public Member Functions

- static void WriteChar (MonochromeView::DynamicView &rView, const int32_t x, const int32_t y, const MonochromeFont &rFont, const char character, const uint8_t drawOption=MonochromeView::DRAW_OPT← _NONE)
- static void WriteString (MonochromeView::DynamicView &rView, const int32_t x, const int32_t y, const MonochromeFont &rFont, const char *const pString, const uint8_t drawOption=MonochromeView::DRAW← _OPT_NONE)

4.12.1 Detailed Description

Monochrome text.

4.12.2 Member Function Documentation

Write 'character' at $\{x, y\}$ point in the view 'rView' using font 'rFont' and draw options 'drawOption'.

Parameters

rView	View to write character in.
X	Horizontal coordinate.
У	Vertical coordinate.
rFont	Font.
character	Character to write.

See also

MonochromeView::DynamicView::DrawAt

Write string 'pString' at {x, y} point in the view 'rView' using font 'rFont' and draw options 'drawOption'.

Parameters

rView	View to write string in.
X	Horizontal coordinate.
У	Vertical coordinate.
rFont	Font.
pString	Null-terminated C like string to write on the display.
drawOption	Draw options,

See also

MonochromeView::DynamicView::DrawAt

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

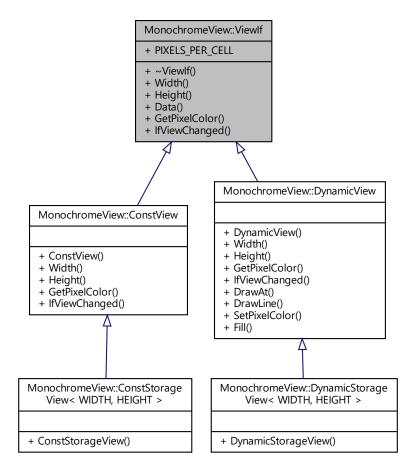
• DisplayApp/App/MonochromeText/Inc/MonochromeText.hpp

4.13 MonochromeView::ViewIf Class Reference

View interface.

```
#include <ViewIf.hpp>
```

Inheritance diagram for MonochromeView::ViewIf:



Collaboration diagram for MonochromeView::ViewIf:

MonochromeView::ViewIf + PIXELS_PER_CELL + ~ViewIf() + Width() + Height() + Data() + GetPixelColor() + IfViewChanged()

Public Member Functions

```
virtual size_t Width () const =0
```

Width of an view in pixels.

• virtual size_t Height () const =0

Height of an view in pixels.

• virtual const uint8_t * Data () const =0

Get constant data of an view.

- virtual bool GetPixelColor (const size_t x, const size_t y) const =0
- virtual bool IfViewChanged () const =0

Check if the view has been changed since the last check.

Static Public Attributes

• static constexpr const size_t PIXELS_PER_CELL = 8U

4.13.1 Detailed Description

View interface.

4.13.2 Member Function Documentation

```
4.13.2.1 GetPixelColor() virtual bool MonochromeView::ViewIf::GetPixelColor ( const size_t x, const size_t y ) const [pure virtual]
```

Get color of the pixel.

Parameters

Χ	Horizontal coordinate.
У	Vertical coordinate.

Returns

Color of the pixel. [0 - black, 1 - default color].

Implemented in MonochromeView::ConstView, and MonochromeView::DynamicView.

4.13.2.2 Height() virtual size_t MonochromeView::ViewIf::Height () const [pure virtual]

Height of an view in pixels.

Implemented in MonochromeView::ConstView, and MonochromeView::DynamicView.

5 File Documentation 35

4.13.2.3 IfViewChanged() virtual bool MonochromeView::ViewIf::IfViewChanged () const [pure virtual]

Check if the view has been changed since the last check.

Implemented in MonochromeView::ConstView, and MonochromeView::DynamicView.

4.13.2.4 Width() virtual size_t MonochromeView::ViewIf::Width () const [pure virtual]

Width of an view in pixels.

Implemented in MonochromeView::ConstView, and MonochromeView::DynamicView.

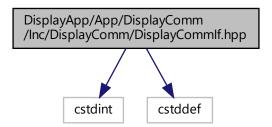
The documentation for this class was generated from the following file:

• DisplayApp/App/MonochromeView/Inc/MonochromeView/ViewIf.hpp

5 File Documentation

5.1 DisplayApp/App/DisplayComm/Inc/DisplayComm/DisplayCommIf.hpp File Reference

#include <cstdint>
#include <cstddef>
Include dependency graph for DisplayCommlf.hpp:



Classes

class DisplayComm::DisplayCommIf
 Interface for communication with display.

5.1.1 Detailed Description

Note

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5.2 DisplayCommlf.hpp

Go to the documentation of this file.

```
5 #ifndef DISPLAY_COMM_DISPLAY_COMM_IF_HPP
6 #define DISPLAY_COMM_DISPLAY_COMM_IF_HPP
8 #include <cstdint>
9 #include <cstddef>
10
11 namespace DisplayComm
15 class DisplayCommIf
16 {
17 public:
18
      virtual ~DisplayCommIf()
19
21
      virtual bool WriteCmd(const uint8_t cmd) const = 0;
28
      virtual bool WriteData(const uint8_t* const pData, const size_t dataSize) const = 0;
35
36 };
38 }
39
40 #endif
```

5.3 DisplayApp/App/DisplayComm/Inc/DisplayComm/DisplayDataCmdlf.hpp File Reference

Classes

· class DisplayComm::DisplayDataCmdIf

Interface for changing mode of the display.

5.3.1 Detailed Description

Note

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5.4 DisplayDataCmdlf.hpp

```
1
4
5 #ifndef DISPLAY_COMM_DISPLAY_DATA_CMD_IF_HPP
6 #define DISPLAY_COMM_DISPLAY_DATA_CMD_IF_HPP
7
8 namespace DisplayComm
9 {
10
12 class DisplayDataCmdIf
13 {
14 public:
```

```
15  virtual ~DisplayDataCmdIf()
16  {
17   }
18
20  virtual void EnableCmdMode() const = 0;
21
23  virtual void EnableDataMode() const = 0;
24 };
25
26 }
27
28 #endif
```

5.5 DisplayApp/App/DisplayComm/Inc/DisplayComm/DisplayResetIf.hpp File Reference

Classes

• class DisplayComm::DisplayResetIf

Interface for the reseting display.

5.5.1 Detailed Description

Note

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5.6 DisplayResetlf.hpp

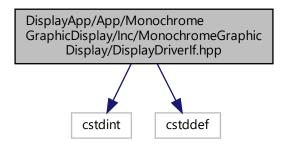
Go to the documentation of this file.

```
1
4
5 #ifndef DISPLAY_COMM_DISPLAY_RESET_IF_HPP
6 #define DISPLAY_COMM_DISPLAY_RESET_IF_HPP
7
8 namespace DisplayComm
9 {
10
12 class DisplayResetIf
13 {
14 public:
15     virtual ~DisplayResetIf()
16     {
17     }
18
20     virtual void Reset() const = 0;
21 };
22
23 }
24
25 #endif
```

5.7 DisplayApp/App/MonochromeGraphicDisplay/Inc/MonochromeGraphicDisplay/← DisplayDriverIf.hpp File Reference

```
#include <cstdint>
#include <cstddef>
```

Include dependency graph for DisplayDriverIf.hpp:



Classes

class MonochromeGraphicDisplay::DisplayDriverIf
 Diver interface of graphical screens.

5.7.1 Detailed Description

Note

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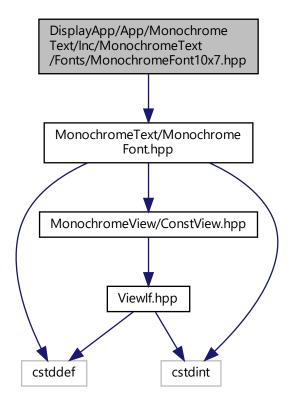
5.8 DisplayDriverIf.hpp

```
5 #ifndef MONOCHROMEGRAPHICDISPLAY_DISPLAYDRIVERIF_HPP
6 #define MONOCHROMEGRAPHICDISPLAY_DISPLAYDRIVERIF_HPP
8 #include <cstdint>
9 #include <cstddef>
11 namespace MonochromeView
12 {
13
14 class DynamicView;
16 }
18 namespace MonochromeGraphicDisplay
19 {
20
22 class DisplayDriverIf
24 public:
25
      virtual ~DisplayDriverIf()
26
27
28
      virtual bool TurnOnDisplay() = 0;
      virtual bool TurnOffDisplay() = 0;
37
38
44
      virtual bool InverseColor(bool inverse) = 0;
45
       virtual bool SetContrast(uint8_t value) = 0;
```

```
52
56 virtual bool RefreshScreen() = 0;
57
61 virtual MonochromeView::DynamicView& GetView() = 0;
62
66 virtual size_t GetWidth() = 0;
67
71 virtual size_t GetHeight() = 0;
72 };
73
74 }
75
76 #endif
```

5.9 DisplayApp/App/MonochromeText/Inc/MonochromeText/Fonts/Monochrome← Font10x7.hpp File Reference

#include "MonochromeText/MonochromeFont.hpp"
Include dependency graph for MonochromeFont10x7.hpp:



Variables

const MonochromeFont MonochromeText::font10x7

5.9.1 Detailed Description

Note

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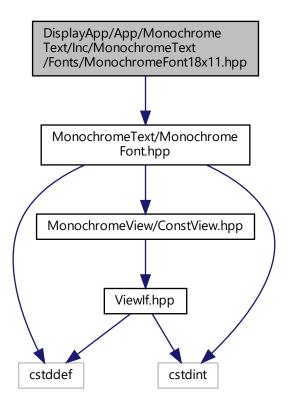
5.10 MonochromeFont10x7.hpp

Go to the documentation of this file.

```
1
4
5 #ifndef MONOCHROMETEXT_MONOCHROMEFONT10X7_HPP
6 #define MONOCHROMETEXT_MONOCHROMEFONT10X7_HPP
7
8 #include "MonochromeText/MonochromeFont.hpp"
9
10 namespace MonochromeText
11 {
12
13 extern const MonochromeFont font10x7;
14
15 }
16
17 #endif
```

5.11 DisplayApp/App/MonochromeText/Inc/MonochromeText/Fonts/Monochrome ← Font18x11.hpp File Reference

#include "MonochromeText/MonochromeFont.hpp"
Include dependency graph for MonochromeFont18x11.hpp:



Variables

• const MonochromeFont MonochromeText::font18x11

5.11.1 Detailed Description

Note

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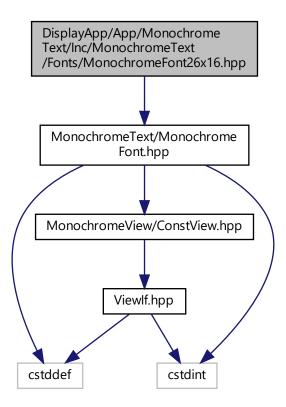
5.12 MonochromeFont18x11.hpp

Go to the documentation of this file.

```
1
4
5 #ifndef MONOCHROMETEXT_MONOCHROMEFONT18X11_HPP
6 #define MONOCHROMETEXT_MONOCHROMEFONT18X11_HPP
7
8 #include "MonochromeText/MonochromeFont.hpp"
9
10 namespace MonochromeText
11 {
12
13 extern const MonochromeFont font18x11;
14
15 }
16
17 #endif
```

5.13 DisplayApp/App/MonochromeText/Inc/MonochromeText/Fonts/Monochrome← Font26x16.hpp File Reference

#include "MonochromeText/MonochromeFont.hpp"
Include dependency graph for MonochromeFont26x16.hpp:



Variables

• const MonochromeFont MonochromeText::font26x16

5.13.1 Detailed Description

Note

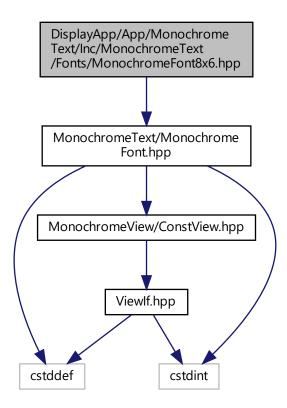
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5.14 MonochromeFont26x16.hpp

```
1
4
4
4
4
5 #ifndef MONOCHROMETEXT_MONOCHROMEFONT26X16_HPP
6 #define MONOCHROMETEXT_MONOCHROMEFONT26X16_HPP
7
8 #include "MonochromeText/MonochromeFont.hpp"
9
10 namespace MonochromeText
11 {
12
13 extern const MonochromeFont font26x16;
14
15 }
16
17 #endif
```

5.15 DisplayApp/App/MonochromeText/Inc/MonochromeText/Fonts/Monochrome← Font8x6.hpp File Reference

#include "MonochromeText/MonochromeFont.hpp"
Include dependency graph for MonochromeFont8x6.hpp:



Variables

const MonochromeFont MonochromeText::font8x6

5.15.1 Detailed Description

Note

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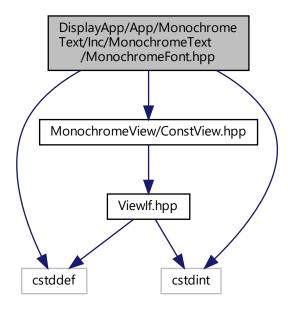
5.16 MonochromeFont8x6.hpp

Go to the documentation of this file.

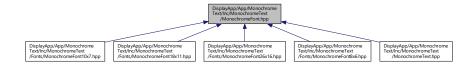
1
4
5 #ifndef MONOCHROMETEXT_MONOCHROMEFONT8X6_HPP
6 #define MONOCHROMETEXT_MONOCHROMEFONT8X6_HPP

5.17 DisplayApp/App/MonochromeText/Inc/MonochromeText/MonochromeFont.hpp File Reference

```
#include <cstddef>
#include <cstdint>
#include "MonochromeView/ConstView.hpp"
Include dependency graph for MonochromeFont.hpp:
```



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



Classes

• class MonochromeText::MonochromeFont

Monochrome font.

5.17.1 Detailed Description

Note

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5.18 MonochromeFont.hpp

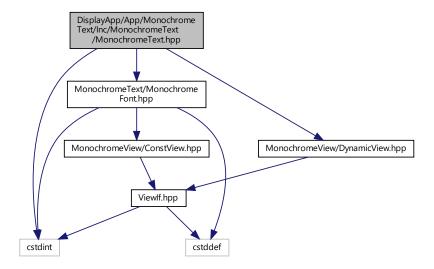
Go to the documentation of this file.

```
5 #ifndef MONOCHROMETEXT_MONOCHROMEFONT_HPP
6 #define MONOCHROMETEXT_MONOCHROMEFONT_HPP
8 #include <cstddef>
9 #include <cstdint>
11 #include "MonochromeView/ConstView.hpp"
13 namespace MonochromeText
14 {
15
17 class MonochromeFont
18 {
19 public:
       MonochromeFont (const uint8_t* const pCharsBytes,
27
                      const size_t width,
const size_t height,
const size_t firstCharAsciiOffset,
28
29
31
                        const size_t charsNum);
32
36
      uint8_t GetWidth() const;
37
       uint8_t GetHeight() const;
       MonochromeView::ConstView GetCharView(const char character) const;
49
50 private:
       MonochromeFont(const MonochromeFont&) = delete;
51
52
       void operator=(const MonochromeFont&) = delete;
       const size_t m_Width;
55
       const size_t m_Height;
56
       const size_t m_FirstCharAsciiOffset;
57
       const size_t m_CharsNum;
       const size_t m_SingleCharBytesNum;
const uint8_t* const m_pCharsBytes;
58
59
61 };
62
63 }
64
65 #endif
```

5.19 DisplayApp/App/MonochromeText/Inc/MonochromeText/MonochromeText.hpp File Reference

```
#include <cstdint>
#include "MonochromeText/MonochromeFont.hpp"
#include "MonochromeView/DynamicView.hpp"
```

Include dependency graph for MonochromeText.hpp:



Classes

class MonochromeText::MonochromeText

Monochrome text.

5.19.1 Detailed Description

Note

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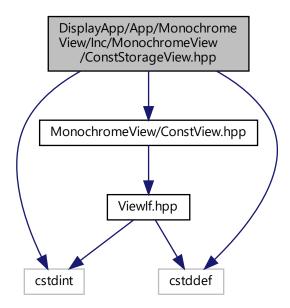
5.20 MonochromeText.hpp

```
5 #ifndef MONOCHROMETEXT_MONOCHROMETEXT_HPP
6 #define MONOCHROMETEXT_MONOCHROMETEXT_HPP
8 #include <cstdint>
10 #include "MonochromeText/MonochromeFont.hpp"
11 #include "MonochromeView/DynamicView.hpp"
12
13 namespace MonochromeText
15
17 class MonochromeText
18 {
19 public:
       static void WriteChar(MonochromeView::DynamicView& rView,
29
                               const int32_t x, const int32_t y,
30
                                const MonochromeFont& rFont,
31
                                const char character,
                               const uint8_t drawOption = MonochromeView::DRAW_OPT_NONE);
32
33
       static void WriteString(MonochromeView::DynamicView& rView,
                                  const int32_t x, const int32_t y,
```

```
44
                                   const MonochromeFont& rFont,
                                   const char* const pString,
const uint8_t drawOption = MonochromeView::DRAW_OPT_NONE);
45
46
47
48 private:
       MonochromeText(const MonochromeText&) = delete;
49
        void operator=(const MonochromeText&) = delete;
50
51 };
52
53 }
54
55 #endif
```

5.21 DisplayApp/App/MonochromeView/Inc/MonochromeView/ConstStorageView.hpp File Reference

```
#include <cstdint>
#include <cstddef>
#include "MonochromeView/ConstView.hpp"
Include dependency graph for ConstStorageView.hpp:
```



Classes

class MonochromeView::ConstStorageView< WIDTH, HEIGHT >

5.21.1 Detailed Description

Note

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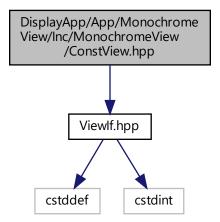
5.22 ConstStorageView.hpp

Go to the documentation of this file.

```
5 #ifndef MONOCHROMEVIEW_CONSTSTORAGEVIEW_HPP
6 #define MONOCHROMEVIEW_CONSTSTORAGEVIEW_HPP
8 #include <cstdint>
9 #include <cstddef>
10
11 #include "MonochromeView/ConstView.hpp"
13 namespace MonochromeView
14 {
15
20 template<size_t WIDTH, size_t HEIGHT>
21 class ConstStorageView :
      public ConstView
23 {
24 public:
      template<trypename... ViewBytesTypes>
ConstStorageView(ViewBytesTypes... viewBytes) :
31
32
33
        ConstView(m_Buffer, WIDTH, HEIGHT),
34
            m_Buffer{static_cast<uint8_t>(viewBytes)...}
35
36
37
38 private:
       const uint8_t m_Buffer[WIDTH * ((HEIGHT + ViewIf::PIXELS_PER_CELL - 1) / ViewIf::PIXELS_PER_CELL)];
40 };
41
42 }
43
44 #endif
```

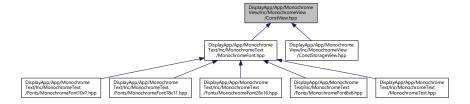
5.23 DisplayApp/App/MonochromeView/Inc/MonochromeView/ConstView.hpp File Reference

#include "ViewIf.hpp"
Include dependency graph for ConstView.hpp:



5.24 ConstView.hpp 49

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



Classes

· class MonochromeView::ConstView

Constant view.

5.23.1 Detailed Description

Note

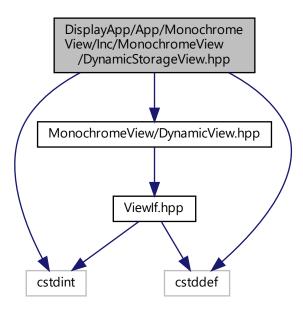
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5.24 ConstView.hpp

```
5 #ifndef MONOCHROMEVIEW_CONSTVIEW_HPP
6 #define MONOCHROMEVIEW_CONSTVIEW_HPP
8 #include "ViewIf.hpp"
10 namespace MonochromeView
12
14 class ConstView :
15
      public ViewIf
16 {
17 public:
      ConstView(const uint8_t* const pBuffer, const size_t width, const size_t height);
25
       size_t Width() const override;
28
30
      size_t Height() const override;
31
       bool GetPixelColor(const size_t x, const size_t y) const override;
36
       bool IfViewChanged() const;
37
38 private:
       const uint8_t* Data() const override;
40
41
       const uint8_t* const m_pBuffer;
43
       const size_t m_Width;
44
       const size_t m_Height;
45 };
46
47 }
49 #endif
```

5.25 DisplayApp/App/MonochromeView/Inc/MonochromeView/DynamicStorage ← View.hpp File Reference

```
#include <cstdint>
#include <cstddef>
#include "MonochromeView/DynamicView.hpp"
Include dependency graph for DynamicStorageView.hpp:
```



Classes

class MonochromeView::DynamicStorageView
 WIDTH, HEIGHT >

5.25.1 Detailed Description

Note

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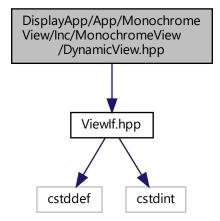
5.26 DynamicStorageView.hpp

```
1
4
5 #ifndef MONOCHROMEVIEW_DYNAMICSTORAGEVIEW_HPP
6 #define MONOCHROMEVIEW_DYNAMICSTORAGEVIEW_HPP
7
8 #include <cstdint>
9 #include <cstddef>
10
11 #include "MonochromeView/DynamicView.hpp"
```

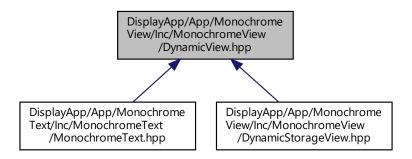
```
13 namespace MonochromeView
15
20 template<size_t WIDTH, size_t HEIGHT>
21 class DynamicStorageView : 22 public DynamicView
24 public:
31
        template<typename... ViewBytesTypes>
       DynamicStorageView(ViewBytesTypes... viewBytes):
    DynamicView(m_Buffer, WIDTH, HEIGHT),
32
33
34
            \verb|m_Buffer{static_cast<uint8_t>(viewBytes)...}|
35
36
37
38 private:
        DynamicStorageView(const DynamicStorageView&) = delete;
39
        void operator=(const DynamicStorageView&) = delete;
40
        uint8_t m_Buffer[WIDTH * ((HEIGHT + ViewIf::PIXELS_PER_CELL - 1) / ViewIf::PIXELS_PER_CELL)];
43 };
44
45 }
46
47 #endif
```

5.27 DisplayApp/App/MonochromeView/Inc/MonochromeView/DynamicView.hpp File Reference

#include "ViewIf.hpp"
Include dependency graph for DynamicView.hpp:



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



Classes

class MonochromeView::DynamicView
 Dynamic view.

Variables

- constexpr const uint8_t **MonochromeView::DRAW_OPT_NONE** = 0x00U No additional draw options.
- constexpr const uint8_t **MonochromeView::DRAW_OPT_TRANSPOSE** = 0x01U Draw transposition of a view.
- constexpr const uint8_t MonochromeView::DRAW_OPT_X_MIRROR = 0x02U
 Mirror a view horizontally.
- constexpr const uint8_t MonochromeView::DRAW_OPT_Y_MIRROR = 0x04U

 Mirror a view vertically.
- constexpr const uint8_t **MonochromeView::DRAW_OPT_NEGATIVE_COLORS** = 0x08U Negative colors of a view.

5.27.1 Detailed Description

Note

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5.28 DynamicView.hpp

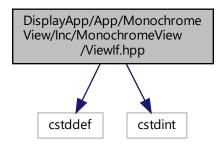
```
1
4
5 #ifndef MONOCHROMEVIEW_DYNAMICVIEW_HPP
6 #define MONOCHROMEVIEW_DYNAMICVIEW_HPP
7
8 #include "ViewIf.hpp"
9
10 namespace MonochromeView
11 {
```

```
14 constexpr const uint8_t DRAW_OPT_NONE = 0x00U;
17 constexpr const uint8_t DRAW_OPT_TRANSPOSE = 0x01U;
18
20 constexpr const uint8_t DRAW_OPT_X_MIRROR = 0x02U;
23 constexpr const uint8_t DRAW_OPT_Y_MIRROR = 0x04U;
26 constexpr const uint8_t DRAW_OPT_NEGATIVE_COLORS = 0x08U;
27
29 class DynamicView :
      public ViewIf
30
31 {
32 public:
39
      DynamicView(uint8_t* const pBuffer, const size_t width, const size_t height);
40
      size_t Width() const override;
42
43
      size_t Height() const override;
48
      bool GetPixelColor(const size_t x, const size_t y) const override;
49
      bool IfViewChanged() const;
51
      void DrawAt(const int32_t x,
60
                   const ViewIf& rAnotherView,
const uint8_t drawOption = DRAW_OPT_NONE);
61
62
63
      71
                     const bool color);
74
80
      void SetPixelColor(const size_t x, const size_t y, const bool color);
81
       void Fill(const bool color);
85
      DynamicView(const DynamicView&) = delete;
89
       void operator=(const DynamicView&) = delete;
90
      const uint8_t* Data() const override;
92
93
      uint8_t* const m_pBuffer;
95
       const size_t m_Width;
96
       const size_t m_Height;
97
       mutable bool m_IfViewChanged;
98 };
99
100 }
101
102 #endif
```

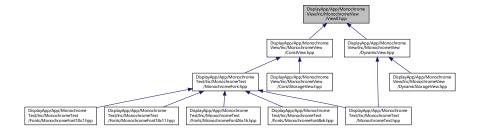
5.29 DisplayApp/App/MonochromeView/Inc/MonochromeView/ViewIf.hpp File Reference

```
#include <cstddef>
#include <cstdint>
```

Include dependency graph for ViewIf.hpp:



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



Classes

• class MonochromeView::ViewIf

View interface.

5.29.1 Detailed Description

Note

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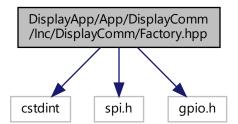
5.30 Viewlf.hpp

```
1
4
5 #ifndef MONOCHROMEVIEW_VIEWIF_HPP
6 #define MONOCHROMEVIEW_VIEWIF_HPP
7
8 #include <cstddef>
9 #include <cstdint>
10
11 namespace MonochromeView
```

```
15 class ViewIf
16 {
17 public:
       static constexpr const size_t PIXELS_PER_CELL = 8U;
18
19
      virtual ~ViewIf()
20
21
22
23
      virtual size_t Width() const = 0;
25
26
      virtual size_t Height() const = 0;
28
29
     virtual const uint8_t* Data() const = 0;
32
39
      virtual bool GetPixelColor(const size_t x, const size_t y) const = 0;
40
      virtual bool IfViewChanged() const = 0;
43 };
44
45 }
46
47 #endif
```

5.31 DisplayApp/App/DisplayComm/Inc/DisplayComm/Factory.hpp File Reference

```
#include <cstdint>
#include "spi.h"
#include "gpio.h"
Include dependency graph for Factory.hpp:
```



Classes

class DisplayComm::Factory
 Factory for display communication layer.

5.31.1 Detailed Description

Note

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5.32 Factory.hpp

Go to the documentation of this file.

```
5 #ifndef DISPLAY_COMM_FACTORY_HPP
6 #define DISPLAY_COMM_FACTORY_HPP
8 #include <cstdint>
10 #include "spi.h"
11 #include "gpio.h"
12
13 namespace DisplayComm
14 {
15
16 class DisplayCommIf;
17 class DisplayResetIf;
18 class DisplayDataCmdIf;
19
21 class Factory
2.2 {
23 public:
       static DisplayResetIf* CreateDisplayReset(GPIO_TypeDef* const pResetPort,
33
                                                    const uint32_t resetPin);
34
       static DisplayDataCmdIf* CreateDataCmd(GPIO_TypeDef * const pDcPort,
43
44
                                                const uint32_t dcPin);
45
56
       static DisplayCommIf* CreateDisplayCommSpi(SPI_TypeDef* const pSpi,
57
                                                     GPIO_TypeDef* const pCsPort,
58
                                                     const uint32_t csPin,
                                                     const DisplayDataCmdIf* const pDataCmdIf);
59
60
61 private:
       Factory(const Factory&) = delete;
62
       void operator=(const Factory&) = delete;
64 };
65
66 }
67
68 #endif
```

5.33 Factory.hpp

```
5 #ifndef SH1106_FACTORY_HPP
 6 #define SH1106_FACTORY_HPP
8 #include <cstddef>
 9
10 namespace MonochromeGraphicDisplay
 11 {
 13 class DisplayDriverIf;
14
15 }
 16
 17 namespace DisplayComm
18 {
 19
 20 class DisplayCommIf;
 21 class DisplayResetIf;
22
23 }
 25 namespace Sh1106
 26 {
27
29 class Factory
 30 {
 31 public:
                               \verb|static MonochromeGraphicDisplay::DisplayDriverIf* Create128x32Driver(DisplayComm::DisplayCommIf*)| | Create128x32Driver(DisplayCommIf*)| | Cre
                               const pDisplayCommIf,
44
                                                                                                                                                                                                                                                                                                                                             DisplayComm::DisplayResetIf*
                               const pDisplayResetIf,
 45
                                                                                                                                                                                                                                                                                                                                             const bool mirrorVertically =
                               false,
 46
                                                                                                                                                                                                                                                                                                                                             const bool mirrorHorizontally =
                                false,
 47
                                                                                                                                                                                                                                                                                                                                              const size_t columnOffset = 0U);
```

5.33 Factory.hpp 57

```
48
 60
                            \verb|static MonochromeGraphicDisplay::DisplayDriverIf* Create128x64Driver(DisplayComm::DisplayCommIf*)| | Create128x64Driver(DisplayCommIf*)| | Cre
                            const pDisplayCommIf,
 61
                                                                                                                                                                                                                                                                                                                  DisplayComm::DisplayResetIf*
                            const pDisplayResetIf,
 62
                                                                                                                                                                                                                                                                                                                  const bool mirrorVertically =
                            false,
 63
                                                                                                                                                                                                                                                                                                                   const bool mirrorHorizontally =
                            false,
 64
                                                                                                                                                                                                                                                                                                                  const size_t columnOffset = 0U);
 65
 77
                            \verb|static MonochromeGraphicDisplay::DisplayDriverIf* Create 128x128Driver(DisplayComm::DisplayCommIf*)| \\
                            const pDisplayCommIf,
 78
                                                                                                                                                                                                                                                                                                                       DisplayComm::DisplayResetIf*
                            const pDisplayResetIf,
79
                                                                                                                                                                                                                                                                                                                       const bool mirrorVertically =
                            false,
80
                                                                                                                                                                                                                                                                                                                       const bool mirrorHorizontally =
                            false,
 81
                                                                                                                                                                                                                                                                                                                       const size_t columnOffset =
                            0U);
82
83 private:
                            Factory(const Factory&) = delete;
void operator=(const Factory&) = delete;
84
85
 86 };
 87
88 }
89
90 #endif
```

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