Orbit IPv3 LCD Commands

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Contents

Introduction

Orbit IP implements a set of commands which allow the host (web server) to display text and geometric primitives on a 1.8” TFT LCD module based on the ***ILI9163*** controller.

All commands consist of a command tag followed by ‘=’ and a comma delimited list of parameters. No spaces are allowed in the command. All commands are terminated by ‘blank’, i.e. any one or more of \r, \n, \t symbols.

There are two main commands used to control the display. The first one is TXTF, used to define a field in which data can be displayed.The second command is DISP and this command can be used to display different texts and shapes in a defined TXTF Field or anywhere in the display if the right coordinates are used.

The coordinate units within this manual are pixels, and a (0,0) origin represents the top left corner of the display area, while (160,128) represents the bottom right corner of the display.

Display Drivers

In order to enable the correct display driver, SDISP command is used. SDISP=1 would enable ***ILI9163*** display driver and thus it will enable all of the following commands.

This command is persistent and requires the reader to be manually rebooted after its execution for the display to be correctly initialised.

Display Commands

Command tag: DISP

Parameters (all decimal values):

Command Name	CMD	P1	P2	P3	P4	P5	P6	P7	P8
Display Line	0	X0	Y0	X1	Y1	Colour			
Display Text in Text Field	1	Field	Text						
Clear The Whole Display	2								
Display a Circle	3	X	Y	Radius	Colour				
Display a filled Circle	4	X	Y	R	Colour				
Display a filled rectangle	5	X	Y	W	H	Colour			
Display a rectangle	6	X	Y	W	H	Colour			
Display a round rectangle	7	X	Y	W	H	Colour			
Display a filled round rectangle	8	X	Y	W	H	Colour	Radius		
Display all fields	10								
Display a triangle	11	X0	Y0	X1	Y1	X2	Y2	Colour	
Display a filled triangle	12	X0	Y0	X1	Y1	X2	Y2	Colour	
Clear a portion of the display	13	X0	Y0	W	H				
Display text on X, Y Position	14	X	Y	Scale	Colour	BgColour	Mode	Text	Font

Description OfDisplay Commands

0) Display Line Command

Description: This command will draw a coloured line between two coordinates.

Parameters:

P1. X0 : 0 to 160
P2. Y0: 0 to 128
P3. X1: 0 to 128
P4. Y1:0 to 160
P5. Colour: integer value representing 16bit colour map R5 G6 B5.

Code Example:

```
echo"DISP=0,0,0,160,128,".(getColour(0,0xFF,0)+0)."\t";
```

Code Snippet 1

1) Display Text in a text field

Description: This command will display text in a defined field.

Parameters:

P1.Field index
P2. Text to display – plain text.

Code Example:

```
echo"DISP=1,7,SUCCESS!\r\n";
```

Code Snippet 2

2) Clear the display

Description: This command will clear the entire display.

Parameters:No Parameters Required

Code Example:

```
echo"DISP=2\t";
```

Code Snippet 3

3) Display a circle

Description: This command will display a filled circle with colour defined by the colour parameterand around origin (X0,Y0) withradius defined by the R parameter.

Parameters:

P1. X0 – 0 to 160– horizontal location of centre
P2. Y0 – 0 to 128 – vertical location of centre
P3. R circle radius 0 to 64
P4. Colour - integer value representing 16bit colour map R5 G6 B5.

**Please note that there is no actual limit of the radius defined earlier. One could use the display circle function with radius bigger than 64 to display an arch at the corner of the display.

Code Example:

```
echo"DISP=3,80,64,64,".(getColour(0xff,0x00,0x00)+0)."\t";
```

Code Snippet 4

4) Display an empty circle

Description: This command will display an empty circle with boundary colour defined by colour parameter, around an origin (X0,Y0) and with a radius defined by R parameter.

Parameters:

P1. X0 – 0 to 160– horizontal location of centre
P2. Y0 – 0 to 128 – vertical location of centre
P3. R circle radius 0 to 64
P4. Colour - integer value representing 16bit colour map R5 G6 B5.

Code Example:
The following Code Snippet will display a given String in a Text Field that was defined earlier

```
echo"DISP=4,80,64,64,".(getColour(0xff,0x00,0x00)+0)."\t";
```

Code Snippet 5

5) Display a filled rectangle

Description: This command will display a rectangle with its top left corner placed on the coordinates X Y and its width and height are defined by parameter [P3] W and [P4] H

Parameters:

P1. X – horizontal location of top left corner
P2. Y – vertical location of top left corner
P3. W – width of the rectangle – 0 to 160
P4. H – height of the rectangle – 0 to 128
P5. Colour - integer value representing 16bit colour map R5 G6 B5

Code Example:

```
echo"DISP=5,20,15,50,50,".(getColour(0,0xFF,0)+0)."\t";
```

Code Snippet 6

6) Display an empty rectangle

Description: This command will display the border of a rectangle with its top left corner placed on the coordinates X Y and its width and height as defined by parameter [P3] W and [P4] H

Parameters:

P1. X – horizontal location of top left corner
P2. Y – vertical location of top left corner
P3. W – width of the rectangle – 0 to 160
P4. H – height of the rectangle – 0 to 128
P5. Colour - integer value representing 16bit colour map R5 G6 B5

Code Example:

```
echo"DISP=6,20,20,64,80,".(getColour(0,0xFF,0)+0)."\t";
```

Code Snippet 7

7) Display a round rectangle

Description: This command will display the border of a rounded rectangle with its top left corner placed on the coordinates X Y and its width and height as defined by parameters [P3] W and [P4] H. Roundness is defined by R.

Parameters:

P1. X – horizontal location of top left corner
P2. Y – vertical location of top left corner
P3. W – width of the rectangle – 0 to 160
P4. H – height of the rectangle – 0 to 128
P5. Colour - integer value representing 16bit colour map R5 G6 B5
P6. R – radius for rounding

Code Example:

```
echo"DISP=7,20,15,50,50,".(getColour(0,0xFF,0)+0).",5 \t";
```

Code Snippet 8

8) Display a filled round rectangle

Description: This command will display the border of a rounded rectangle with its top left corner placed on the coordinates X Y and its width and height are defined by parameter [P3] W and [P4] H

Parameters:

P1. X – horizontal location of top left corner
P2. Y – vertical location of top left corner
P3. W – width of the rectangle – 0 to 160
P4. H – height of the rectangle – 0 to 128
P5. Colour - integer value representing 16bit colour map R5 G6 B5
P6. R – radius for rounding

Code Example:

```
echo"DISP=8,20,15,50,50,".(getColour(0,0xFF,0)+0).",5 \t";
```

Code Snippet 9

10) Display all defined static fields

Description: This command will display all defined static fields such as IP Address field.

Parameters:

This command requires no parameters

Code Example:

```
echo"DISP=10";
```

Code Snippet 10

11) Display an empty triangle

Description: This command will display an empty triangle between three coordinate points.

Parameters:

P1. X0
P2. Y0
P3. X1
P4. Y1
P5. X2
P6. Y2

Code Example:

```
echo"DISP=11,50,0,25,50,75,50,".(getColour(0xff,0,0)+0)."\t";
```

Code Snippet 11

12) Display a filled triangle

Description: This command will display a filled triangle between three coordinate points.

Parameters:

P1. X0
P2. Y0
P3. X1
P4. Y1
P5. X2
P6. Y2
P7. Colour

Code Example:

```
echo"DISP=12,50,0,25,50,75,50,".(getColour(0xff,0,0)+0)."\t";
```

Code Snippet 12

13) Clear a portion of the display

Description: This command will clear the display with black rectangle at coordinates X Y and width and height as defined by parameters [P3] W and [P4] H

Parameters

P1. X – horizontal location of top left corner
P2. Y – vertical location of top left corner
P3. W – width of the rectangle – 0 to 160
P4. H – height of the rectangle – 0 to 128

Code Example:

```
echo"DISP=13,50,50,128,160 \t";
```

Code Snippet 13

14) Display text on X, Y Position

Description: This command will display a string at given coordinates.

Parameters

P1. X – horizontal location
P2. Y – vertical location
P3. Scale
P4. Text Colour
P5. Back Ground Colour
P6. Mode: If 0 was passed, Then X and Y would mark the beginning of string. If 1 was passed then the firmware would take Y position and calculate X so that the String would be placed on the centre of the display
P7. Text
P8. Font:
    1. Small Font
    2. Large Font
    3. Small Font 2 (Allows Scaling)
    4. Large Font 2

Code Example:

```
echo"DISP=14,0,90,1,".(getColor(0xff,0x00,0x00)+0).",0,2,Hello
                                World,2\t";
```

Code Snippet 14

Text Field Definition

Command tag: TXTF

Some of the DISP commands mentioned earlier require TXTF fields to print data into.

TXTF fields are defined atreader powerup, then used throughout the rest of the code to display different strings and parameters.

Each text field has multiple parameters to define behaviour, as follows:

- Field index (*$fldind*): Describes the field number which parameters will be applied to.

- Font type (*$ftype*)
    1. Small Font
    2. Large Font
    3. Small Font 2 (Allows Scaling)
    4. Large Font 2

- Font scale (*$fscale*)
  This parameter will scale each character in the field by *X time.*
- Text field coordinates
  X Location (*$xloc*)– 0 to 160
  Y location (*$yloc*) – 0 to 128

- Background colour (*$bg*)
  integer value representing 16bit colour map R5 G6 B5.

- Foreground colour (*$fg*)
  integer value representing 16bit colour map R5 G6 B5.

- Window x location (*$winx*) - 0 to 160
- Window y location (*$winy*) - 0 to 128

- Window width (*$winw*) – 0 to 160
- Window height (*$winh*) – 0 to 128

- Text source (*$src*)
  0: Empty Field to be used in conjunction with display text in text field display command
  1: IP Address
  4: Time
  5: Date
  6: Date In the following format 18/Jan/17
  7: Date In the following format 18/Jan/2017
  8: Out of order message

- Border width (*$border_w*) – 0 to 255. Recommended values are 0 to 20. Width of 0 indicates 'no border'. Border size is defined by window properties.

- Border colour (*$border_col*) - integer value representing 16bit colour map R5 G6 B5.

• Rounded corners (*$round*) – 0 to 255. Indicates the radius of the border rectangle. Recommended values are 0 to 20. Radius of 0 indicates 'no rounding'.

To define a text field combine all the parameters following TXTF command tag:

```
echo"TXTF=".{$fldind},{$ftype},{$fsize},{$fscale},{$xloc},{$yloc},{$bg},{$
fg},{$winx},{$winy},{$winw},{$winh},{$src},{$border_w},{$border_col},{$roun
d}\r\n";
```

RMCT Parameter and RETC Request

The parameter "RMCT=xxxx" prompts a new HTTP request called "RETC" from the reader XXXX microseconds after its execution. This "trailing" request can be used to clear the LCD from temporary messages.

For example:

case "RETC":

echo "DISP=5,0,14,160,114,".$backgroundcolour."\t";

echo "DISP=1,2,TAP CARD TO ENTER\r\n";

break;

Appendix

GetColour Function Declaration

Throughout the examples used in this manual we often call `getColour`, a function that takes colours in format Red0-255 Green0-255 Blue 0-255, and return RGB565 colour value that can be used with various DISP commands. That function can be defined in PHP as follows:

```
Function getColour($r,$g,$b)
{
   $col=(($r>>3)<<11)|(($g>>2)<<5)|($b>>3);
   return$col;

}
```

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