ELE6022-B: Advanced Electronic Systems Design
Introduction to Graphical LCD

1. INTRODUCTION

The purpose of this document is to introduce to you the graphical LCD that you will be using in the coursework part of the module and take you through a demo application. The usage of this LCD is very similar to the 240x320 pixel LCD used in Lab3, only different in its size interface and the supporting library.

2. GRAPHICAL LCD INTRODUCTION

You are now going to start using the SPI graphical LCD that you will be using for the coursework for this project. This is a 128x128 pixel graphical LCD as shown in Fig. 1. It uses the SPI interface and needs eight connections which are shown in Table 1 and Fig. 2.

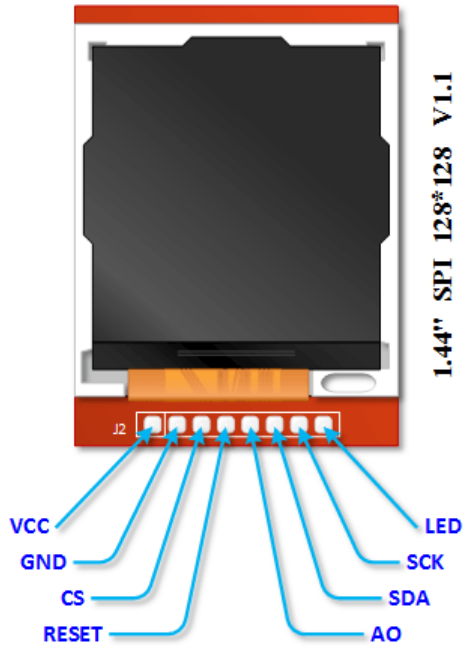

Figure 1: 128x128 GLCD

Table 1: GLCD Connections

GLCD Pins	Arduino Uno Pins
VCC	5V
GDN	GND
CS	Digital Pin 10
RESET	Digital Pin 9
A0	Digital Pin 8
SDA	Digital Pin 11
SCLK	Digital Pin 13
LED	3.3V

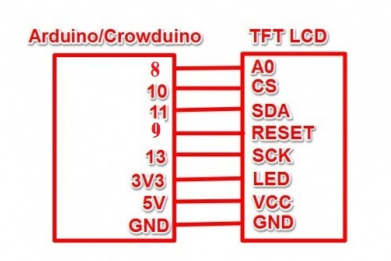

Figure 2: GLCD Connections

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Exercise 1: Running Demo programme on Graphical LCD

Get the “LCDDemo.ino” sketch from LMS and upload this to your Arduino. Make yourself comfortable with the workings of LCD. Try out a few functions and seek help in case there is any confusion. This LCD is to be used in the coursework.

The TFT LCD libraries, Adafruit_GFX.h and Adafruit_ST7735.h implements a number of functions to send correct commands to the graphical LCD through the SPI interface as defined in its datasheet. The Adafruit_GFX.h is a standard libraries while Adafruit_ST7735.h is the hardware specific library for this LCD. Some of the functions are:

Function	**Explanation**
InitR	This will initialize 128x128 pixel of Graphical LCD and Make ready for SPI Communications
fillScreen(<color>)	It will fill out screen with the given color
setCursor(int x, int y)	Moves cursor to position x (0 – 127), y (0 – 127). Worth noting that 0,0 is bottom Right-hand corner of the display
int16_t getCursorX(void) int16_t getCursorY(void)	Gives the value of the cursor in terms of (x,y) coordinates
drawPixel(int x, int y, color)	Sets the pixel at position (x,y) with desire color
drawLine(int16_t x0, int16_t y0,int16_t x1, int16_t y1, uint16_t color)	Draws a line from (x0,y0) to (x1,y1) with chosen color.
drawCircle(int x0, int y0, int r,uint16_t color)	Draws a circle centred on (x0,y0) of radius r with chosen color
fillRect(int16_t x, int16_t y, int16_t w, int16_t h, uint16_t color)	Draws a filled rectangle of width w and height h with bottom left-hand corner being at position (x,y) with chosen color
drawRect(int16_t x, int16_t y, int16_t w, int16_t h, uint16_t color)	Draws a rectangle outline of width w and height h with bottom left-hand corner being at position (x,y) with chosen color
setTextColor(<color>)	It set the text color to mentioned color
setTextSize(x)	It set the text size to mentioned pixel size x

Table 1: Definition of graphical LCD functions

Color definitions are the same as given in Lab 3. More colors can be obtained by changing the hex values.

For more functions, kindly refer to the two libraries mentioned earlier.