

ELTN 117

**Arduino Programming :**  
*Intro to LCD Displays*

# Objectives

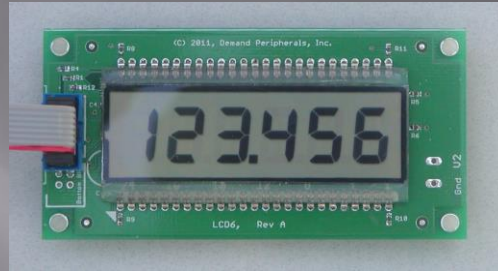
- ▣ Understand how an LCD display works
- ▣ Programming LCDs
- ▣ Understand using built-in LCD libraries
- ▣ Understand how to wire LCD displays

# What is an LCD display?

Actually there are three main types of LCD displays:

**Numeric:**

(Requires a separate driver I.C.)



**Alphanumeric:**

(Includes a microcontroller)



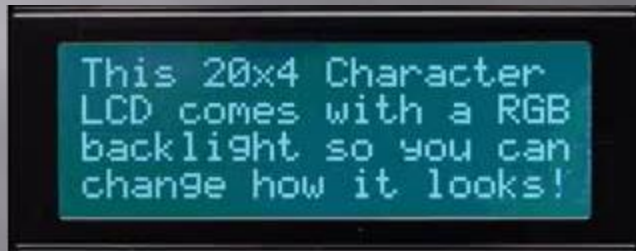
**Graphic:**

(more complex)

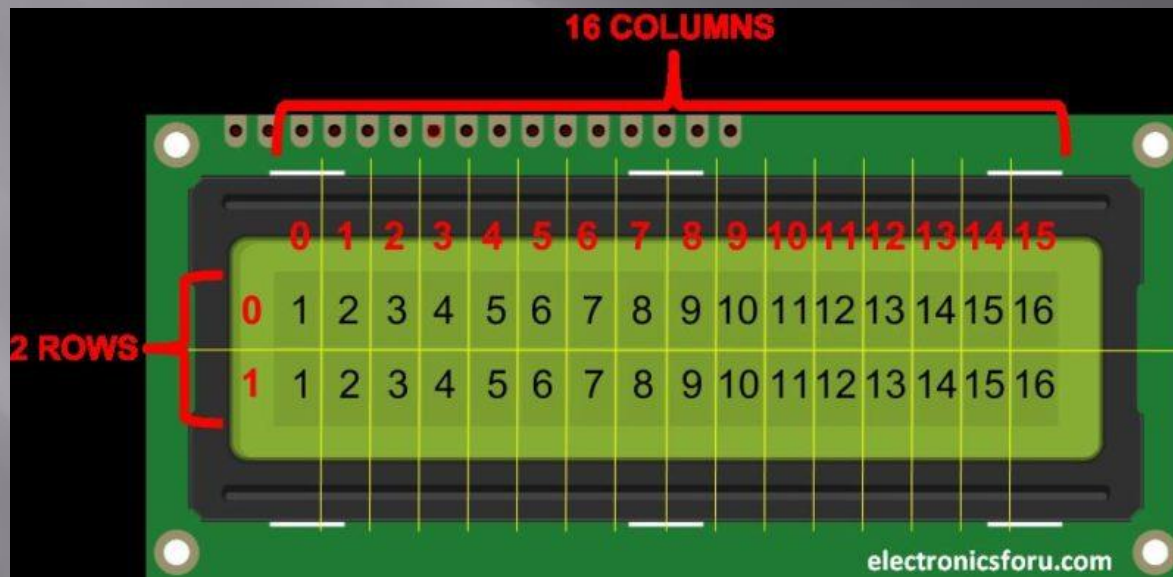


# Alphanumeric

- ▣ Alphanumeric are the most common for projects.
- ▣ Inexpensive / easy to interface
- ▣ Allows text / numbers / special characters to be displayed.
- ▣ Variety of sizes:

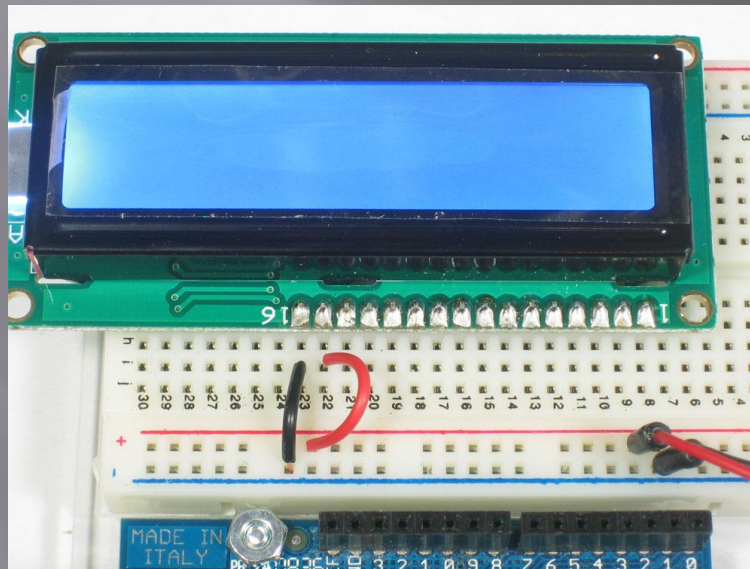


# Data is arranged in rows and columns:



# Wiring LCD's

Four main parts to wire:



Backlight (if provided)



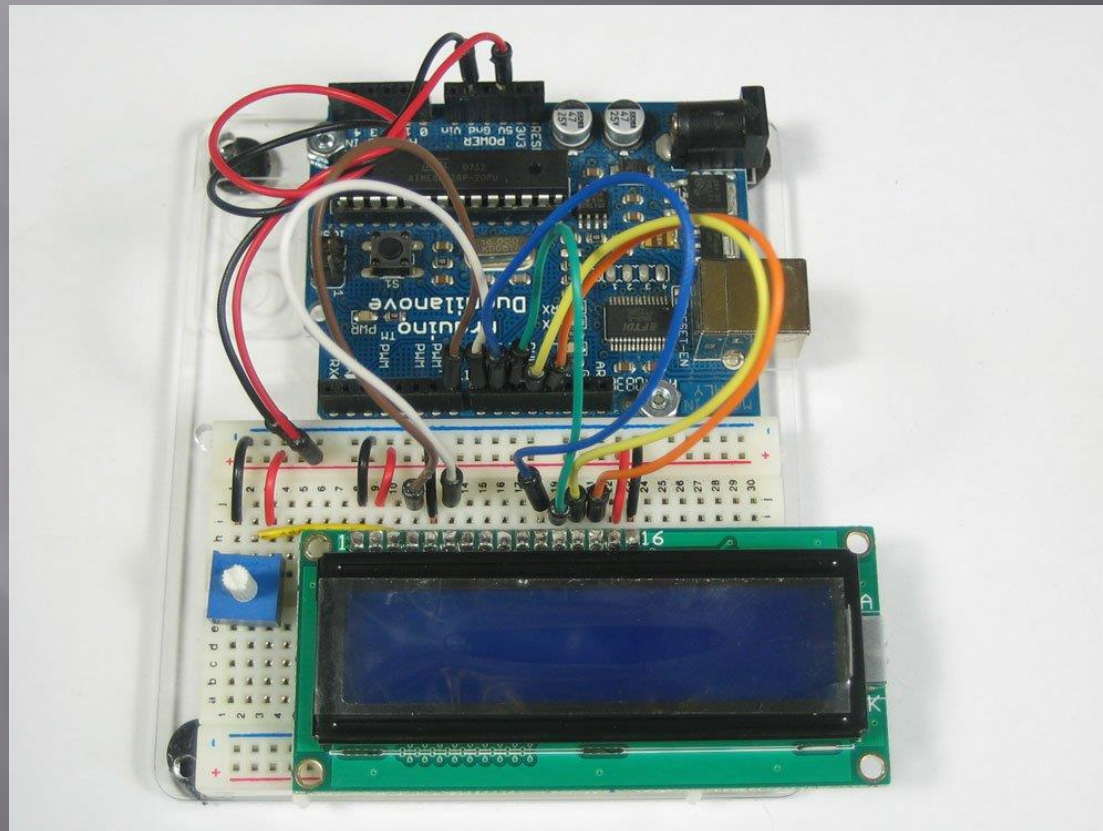






# Wiring

Wiring Data pins:



# How to program...

- LCD's are fairly complicated, fortunately there is a nice built in library for the Arduino:
- `#include <LiquidCrystal.h>` (must be included at beginning of in code)
- Basic functions:

*Assign pin numbers:*

```
const int rs = 12, en = 11, d4 = 5, d5 = 4, d6 = 3, d7 = 2;  
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);
```

*Numbers of columns / rows:*

```
lcd.begin(16, 2);
```

*Change cursor location:*

```
lcd.setCursor(0, 1);
```

*Printing to LCD:*

```
lcd.print("hello, world!");
```

# References

<https://electronicsforu.com/resources/learn-electronics/16x2-lcd-pinout-diagram>

[https://www.crystalfontz.com/product/cfah1602dyyhet-16x2-character-lcd?kw=&origin=pla&gclid=Cj0KCQjwnqzWBRC\\_ARIsABSMVTOYnITCBaSxrHkD3jkFyPQq34seBj\\_g-lHBC1mtJVYSPfBadKC9D7gaAjvIEALw\\_wcB](https://www.crystalfontz.com/product/cfah1602dyyhet-16x2-character-lcd?kw=&origin=pla&gclid=Cj0KCQjwnqzWBRC_ARIsABSMVTOYnITCBaSxrHkD3jkFyPQq34seBj_g-lHBC1mtJVYSPfBadKC9D7gaAjvIEALw_wcB)

<https://learn.adafruit.com/assets/939>