

**15-348: Embedded Systems**  
**Fall 2022**

**Lab 8: Adding an LCD**

Due: Beginning of lab time on Thursday, October 6, 2022

## Introduction

This hardware lab consists of hooking up a 2x16 Line LCD to the 6502 microprocessor.

Your final circuit will be evaluated based on both its functionality and the cleanness of the circuit layout and wiring.

## Adding the Screen

1. Watch the following video:

[https://www.youtube.com/watch?v=o08\\_2JJV0B4](https://www.youtube.com/watch?v=o08_2JJV0B4)

Note that you do not need to install `vasm`. Going forward, we will provide you with precompiled programs to flash. (But if you want to install `vasm` and play with it, go ahead!)

2. Watch the following video and follow it as closely as possible:

<https://www.youtube.com/watch?v=FY3zTUaykVo>

## What to Demo

During your demonstration, we expect you to show us the hello world program printing on the screen.

## Additional Resources

- To save you time, the following binary prints hello world to the screen:  
<https://web2.qatar.cmu.edu/cs/15348/labs/08/helloworld.bin>

## Pro Tips

1. You should include a bypass capacitor between power and ground on every power/ground rail that you hook up. (Even though Ben doesn't do it in the video.)
2. You may wish to run extra power/ground wires from the top of your board (where you plug in the power source) to the rails where you power the screen. Without this, you may get intermittent errors. (I did, on my board, until I added the extra wires.)