**SRAM**

The CY7C128A chip is a CMOS static RAM organized as 2048 words by 8 bits. Easy memory expansion is provided by an active LOW Chip Enable (CE), and an active LOW Output Enable (OE) and drivers that are three-state. Writing to the device is accomplished when the Chip Enable and Write Enable (WE) inputs are both LOW. Data , which are on the pins IO0 -I/O7 are written into the memory location specified on the address pins A0 -A10. Reading the device is accomplished by taking Chip Enable and Output Enable and keeping them low while Write Enable remains high. Under these conditions, the contents of the memory location specified on the address pins will appear on the eight I/O pins. The I/O pins remain in high-impedance state when Chip Enable or Output Enable is high or Write Enable is low.

**Input/Output**

1. Keyboard

The Series 96 is uses conductive rubber to mate the appropriate PC board traces. It’s features also includes having matrix circuitry easily customized legend, matrix circuitry, termination mates with standard connectors, tactile feedback to operator, 1,000,000 operations per button, it is compatible with high resistance logic inputs and is tested to rigid statistical process control to insure that it is reliable. The keyboard itself contains 12 keys, which are the numbers 0 - 9, the “\*” symbol and the “#” sign.

1. LCD Display

The LCD display that will be used has a module 1 line x 16 characters.

**Test Plan**

In order to make sure the finished product runs smoothly a plan will be needed for debugging the UMBC 8086 hardware and the software.

* *Hardware*

The hardware that will be used for the finished product is the UMBC 8086 Trainer System. However it is required that a way needs to be made in which our finished product will work in the integrated system that was talked about earlier in the report. In order for this to be possible a schematic needs to be done for both the UMBC Trainer Board and the original board. The goal of the schematic will be to first wire it up there with the logic that makes sense. After both schematics are done then the next step would be to load the program and then determine if it is a software issue or is it a hardware issue. Setting the plan to test the hardware this way also determines if anything was overlooked in building the schematic. Then if it is determined that it is a hardware issue we will go back and change the schematic. Its from the schematic that we can determine how to program the code correctly.

* *Software*

In order for the software to work correctly it has been split into 5 different versions. Splitting into 5 different versions will allow for incremental testing as well for efficient debugging.

* Lab4v1.asm

Labv1.asm is the first version of the code that will be tested. It has only one function, it test displaying on the LCD. The code displays a welcome message that reads,

“Welcome to CMPE 310

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Testing the program to see if it can display to the LCD screen is important in the development of the product because it tests the boundaries of the screen that will be displayed. A restriction was given that the screen can only show 20 characters per line and a total of four lines can be shown at a time. This display is the only verification that our code works correctly. In conclusion having a knowledge of the medium that will be worked with is very important.

* Lab4v2.asm- (Will include IC)

This is the version is which the IC’s that will be used in the project will actually be programmed.

* Lab4v3.asm- (will include interupts)

In this version of the code all the interrupts will be programmed so the 8086 will know when to stop what it is doing and do a requested function.

* Lab4v4.asm- (will include functionality)

This is the version of the code in which we will actually be programming the Mortgage calculator. The program may or may not be set up to print to the LCD however it will be programmed to do the correct caculations.

* Lab4v5.asm- (will inlude UI(final version)

This is the the final version of the program and this part definitely includes printing to the LCD in the right format restrictions. This part also includes alot of ppolishing of the code to make it run faster, etc.

