Lab 0 Introduction to Micromagic ECE334S

Objective:

The purpose of this lab is to get you familiar with the software we use in the labs. We will use the SUE design manager and MAX layout environment tools from Micromagic Inc. (www.micromagic.com). In this lab, we will use SUE to do schematic entry and simulations. The lab also gives a brief introduction of how to use MAX for doing full-custom layout, which will be further explored in Lab 2. At the end of this lab you should become familiar with the tools as well as the design methodology for the labs.

Preparation:

P1) ***Software Setup***

The Micromagic software is accessible from all eecg machines. To setup, simply append these lines to the end of the .cshrc file in your home directory, then logout and re-login:

```
#ece334F Micromagic setup
if ( ! $?ECE451 ) then
source /cad2/ece451/SOURCEME
setenv ECE451 1
endif
```

Now you should be able to start SUE and MAX by the following commands

sue (to start SUE)
max (to start MAX)

There are limited number of licenses available so you should start doing the labs as early as possible.

P2) ***SUE***

Read through the SUE tutorial before your lab session. This will help you finish your lab in time.

Lab Work:

L1) ***SUE Tutorial***

1- Start SUE by typing “sue”.

2- From the Help menu, select SUE tutorial.

3- Select SUE in the “Which Tutorial” field and click “ View Tutorial in Acroread.” Acrobat should start up with the SUE tutorial.

4- Start the tutorial on page 9 of the PDF (which is page 1 of the tutorial).

5- Follow the instructions and complete the tutorial with the following notes:

- Page 2: skip the whole page.

- Page 14 (step 4): after changing the transistor size to 8/4, change it back to 2/1.

- Pages 35-51: skip starting from “using pulsegen” to “ Cross probing with MAX”

- Pages 51-end: Try “Cross Probing with MAX” after doing part L2 below. Copy FA.max and FA.sue from the webpage into your working directory.

Expected Results:

1- Schematic plot of Pulse_generator.sue

2- SPICE plot (page 23).

3- IRSIM plot (page 25), print to a .ps file within IRSIM, then print it out.

L2) ***MAX Tutorial***

We will start up MAX and try some of the basic layout commands.

1- Start MAX by typing “max”.

2- Draw a box.

3- Resize it and move it around using the middle mouse button.

4- Paint it to form a Poly layer. You can do this by simply right clicking on the Poly button in the palette (on the left).

5- Now try moving it around again, and try stretching it in both directions using the "Edit edge" command in the "Edit" menu, or simply type "a".

6- In case you want to undo any change you can simply press "u". It is possible to undo several commands by pressing "u" several times.

7- Now create another box and paint it with Poly by simply right clicking on the first Poly box. You can use this to erase a painted box, by right clicking on an empty part of your layout, or simply select the box and type "q".

8- Draw a piece of wire in metal1. To do that you can type "w" and use the mouse to draw the metal wire. Whenever you need to bend the wire left-click and move the mouse to the new direction. To end the wire, click the middle button of the mouse.

If you need help you can run the MAX tutorial from the "Help" menu, by selecting "MAX tutorial." Select MAX in the "Which Tutorial" field and click " View Tutorial in Acroread." Acrobat should start up with the MAX tutorial.

Expected Results:

- Layout plot of your Poly boxes and metal wire. (See printing in MAX section below)

Printing in MAX

Direct printing is not available in MAX. We can use the unix tool "xv" to capture a postscript file from the screen instead.

1- Maximize your design in the MAX window for optimum screen capture.

2- Execute "xv" in a command window, right click on the popped up window.

3- Press "grab" button.

4- The mouse pointer becomes a cross. Drag and select the area on the screen you want to capture.

5- Select output format as postscript, press "save" button and give filename "abc".

6- A postscript file abc.ps is saved in the current directory.

7- Print the postscript file using "lpr".