Virtual DE1SOC manual 2020 v001

The Virtual DE1SOC is a program that adds a ASCII user interface to ModelSim RTL simulations. The program has two main sections, an initial configuration menu followed by the main simulation loop that can run in either a continuous mode or stepped mode. The program is intended for use in the University of Melbourne subject Digital Systems Design ELEN30010; contact Prof. Manton for further details.

0.1 Getting started

The initial set up might be a bit daunting but once you have python 3.8 for Windows or python 3.6 for Redhat set up you are mostly done! The main options for installation are:

1. Download from Canvas Files → Lab Notes → Virtual DE1SOC

0.1.1 Getting started Windows

The windows set up process is reasonably simple.

1. Download Python 3.8 from https://www.python.org/downloads/

   You may find it helpful to add python to the PATH variable.

2. Obtain a copy of the Virtual DE1SOC program from either Git or the LMS

   If you are unsure obtain the LMS version under lab notes.

3. Install the keyboard library using the following Command Prompt (CMD)

```
pip install keyboard
```

4. Navigate to src / virtual_de1soc.py and run it by clicking on it or run it by navigating to that path in the CMD and run it using

```
python virtual_de1soc.py
```

0.1.2 Getting started ELEN30010 Virtual Machine

Using Linux for this to run correctly root permission is needed to access the key presses. This can be accessed by typing **sudo su** into the terminal.

After opening up the terminal

```
sudo su
yum update
yum install centos-release-scl
yum --disablerepo="*" --enablerepo="centos-sclo-rh" list *python3*
yum install rh-python36
scl enable rh-python36 bash
python -V
echo 'scl enable rh-python36 bash' >> ~/.bash_profile
```

Listing 1: Virtual machine Set up

If the command python -V returns python 2 and not python 3 you will need to set scl enable rh-python36 bash again.

Remember that root permissions are needed for the keyboard loop and that this can be accessed by typing **sudo su** into the terminal.

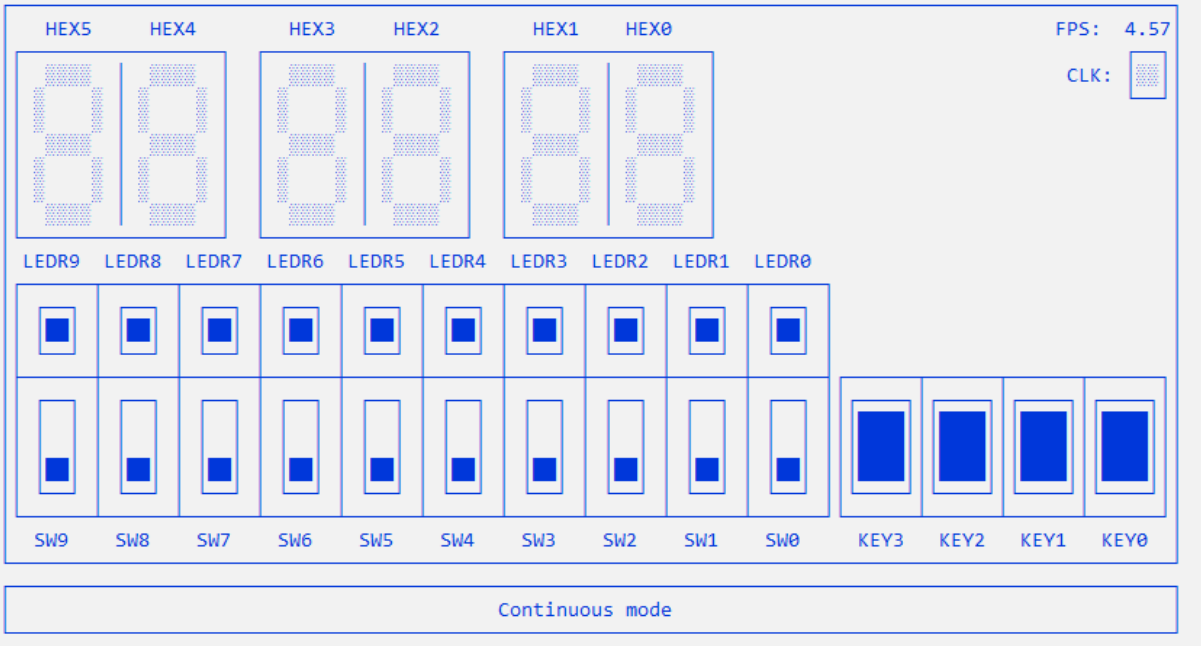
0.2 Using the program

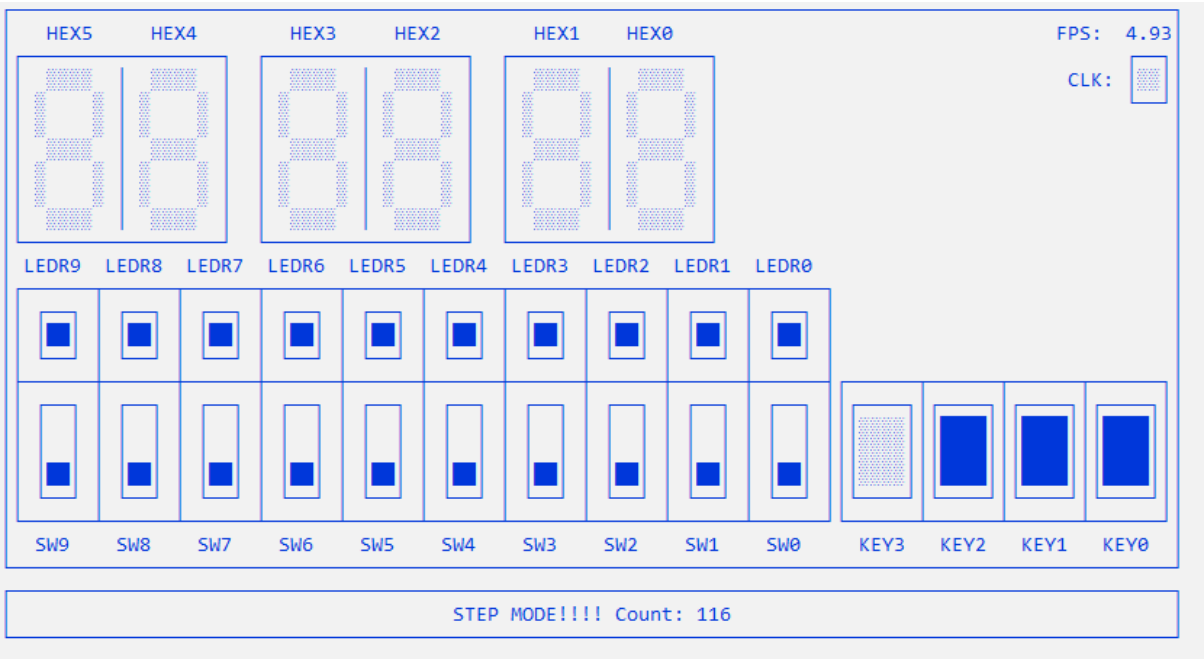
Once you have the program up and running you can now run interactive RTL simulations with your own virtual FPGA board!

```
                    Welcome to the Virtual DE1SOC configuration menu view
 a) Continue with current setting (or enter)
 b) Reset settings from File
 c) Save to Config File
 d) Save to Config file and Continue
 e) Reset from Config File and Continue

 0) vsim_duration___________: 10ms
 1) lib_name________________: work
 2) lib_top_level_entity____: MyProject
 3) frame_time______________: 0.2
 4) SW_key__________________: ['0', '9', '8', '7', '6', '5', '4', '3', '2', '1']
 5) KEY_key_________________: ['p', 'o', 'i', 'u']
 6) CLK_key_________________: c
 7) quit_key________________: q
 8) step_key________________: s
 9) forward_key_____________: f
10) step_state______________: False
11) target_path_____________: E:\3009-project-virtual-de1soc\GIT\virtual-de1soc\virtual-de1soc\src
12) modelsim_path___________: C:\intelFPGA_lite\18.1\modelsim_ase\win32aloem\

Please select your option for the list above and then press enter...
```




HEX5
HEX4
HEX3
HEX2
HEX1
HEX0
FPS: 4.93
CLK:
LEDR9
LEDR8
LEDR7
LEDR6
LEDR5
LEDR4
LEDR3
LEDR2
LEDR1
LEDR0
SW9
SW8
SW7
SW6
SW5
SW4
SW3
SW2
SW1
SW0
KEY3
KEY2
KEY1
KEY0
STEP MODE!!!! Count: 116