Lab 8: VGA Display

Due: 18:30, November 29, 2016

Action Item

Modify the Verilog code introduced in class to design a circuit for controlling the VGA display. The controller has the following input ports:

- input clk;
- input reset;
- input en;
- input dir;

Action Item

and the following output ports:

- output [3:0]vgaRed;
- output [3:0]vgaGreen;
- output [3:0]vgaBlue;
- output hsync;
- output vsync;

Action Item

The behavior of the circuit is explained below.

- At the beginning or when pressing the **reset** button, the VGA display will show the image (e.g., kanahei.jpg) at the origin position. It will stay still until the **en** button is pressed.

Action Item

- The image will start/resume scrolling left or right in a column- by-column manner under the frequency of clk divided by 2^{22} (i.e., clk/2^{22}), or pause, depending on whether the number of the **en** button pressed is odd or even. The scrolling direction of the image is determined by dir input. If dir is 0, the image will scroll left. If dir is 1, the image will scroll right.

Example

at the begining

or pressing **reset**

Example

set **SW0** = 1, press **en**

➔ start to scroll right

(100 columns scrolled right)

Example

(200 columns scrolled right)

Example

(400 columns scrolled right)

Example

press **en**

➔ pause

(still 400 columns scrolled right)

Example

set **SW0** = 0, press **en**

➔ resume to scroll left

(400 columns scrolled right and 100 columns scrolled left)