```
1   `timescale 1ns / 1ps
2   /*************************************************************************
3    * File Name: vga_controller.v
4    * Project: VGA Sync
5    * Designer: Marc Cabote
6    * Email: marcdominic011@gmail.com
7    * Rev. Date: 12 November, 2017
8    *
9    * Purpose: This project introduces the use of vga(video graphics array)
10   *          display. The design will have 640 x 480 resolution.
11   *          The paddle's movemont will be controlled by the user using buttons
12   *           0-1. The vga sync is then verified through
13   *          simulation with the use of test fixtures. The code will
14   *          then be programmed to the board with the use of a vga monitor.
15   *
16   *
17   * Notes:   -  This is the top level module for this project
18   *          -  This module has an asynchronous reset input.
19   *          -  Button up and down is to move the paddle up or down
20   *          -  Reset is button middle
21   *
22   *************************************************************************/
23  module vga_controller(input clk, rst,
24                        input [1:0] btn,
25                        output hsync , vsync,
26                        output [11:0] rgb);
27
28
29     wire video_on; //wire for the 2 to 1 mux
30     wire rst_out;  //wire for aiso to vga sync reset
31     wire[9:0] pixel_x, pixel_y;
32
33     aiso
34     m0(.clk(clk), .rst(rst), .rst_out(rst_out));
35
36     vga_sync
37     m1( .clk(clk), .rst(rst_out),.pixel_x(pixel_x), .pixel_y(pixel_y),
38         .hsync(hsync), .vsync(vsync), .video_on(video_on));
39
40     pixel_generator
41     m2( .clk(clk), .rst(rst_out), .btn(btn), .video_on(video_on),
42         .pixel_x(pixel_x), .pixel_y(pixel_y), .rgb(rgb));
43
44  endmodule
45
```