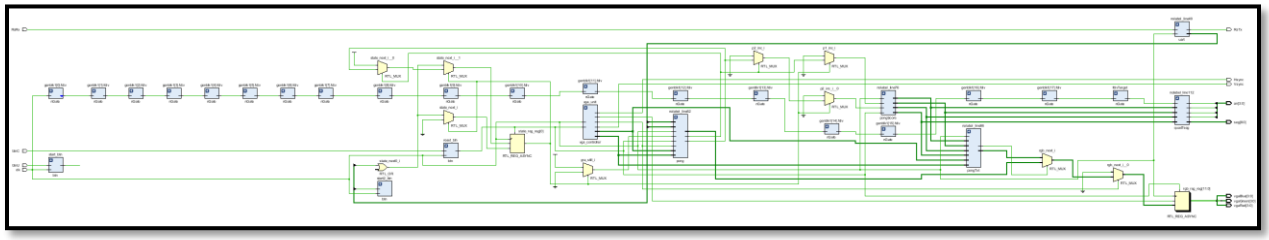
Modular Design



Main Module

1. **main**: This module is the top-level module responsible for controlling the overall state, connecting the other modules together. Its main duties include:
    a. Establishes synchronous communication channels between modules.
    b. Process and control the game state.
    c. Coordinates with the **pong** and **pongTxt** modules to assign RGB values for each pixel on the display.
2. **pong**: responsible for processing and rendering the graphical elements of the main Pong game, including the walls, paddles for each player and the ball. Its main duties include:
    a. Process and tracks the positions of paddles for each player. Handles move input, sets the moving speed, and updates the position on every clock cycle.
    b. Process and tracks the ball's position and direction, handles ball collisions with walls and paddles, updates the position on every clock cycle.
    c. Process and determine which player scores a point when the ball successfully passes the opponent's paddle.
    d. Processes the output RGB value for each XY coordinate, customizing it for each game element (walls, paddles, ball).
3. **pongScore**: responsible for managing and updating the total scores of Player 1 and Player 2. Its main duties include:
    a. Increments the respective player's total score when a point is scored.
    b. Output each digit of the total score for Player 1 and Player 2 separately.
4. **pongTxt**: responsible for processing and generating the output RGB values for each XY coordinate to display the scores of Player 1 and Player 2.
5. **vga_controller**: responsible for rendering the graphical output via VGA, specifying rendering process with HSync, VSync, X and Y coordinates.
6. **uart**: responsible for receiving values from the UART interface and transmitting signal back based on specific key. The supported keys are as follows:

	Player 1	Player 2
paddle up	W	I
paddle down	S	K

And spacebar (“ “) means throw new ball for next round.

7. **quad7seg:** responsible for displaying each player's digit score on seven-segment displays in the Basys 3 board.