Pong Game

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Contents

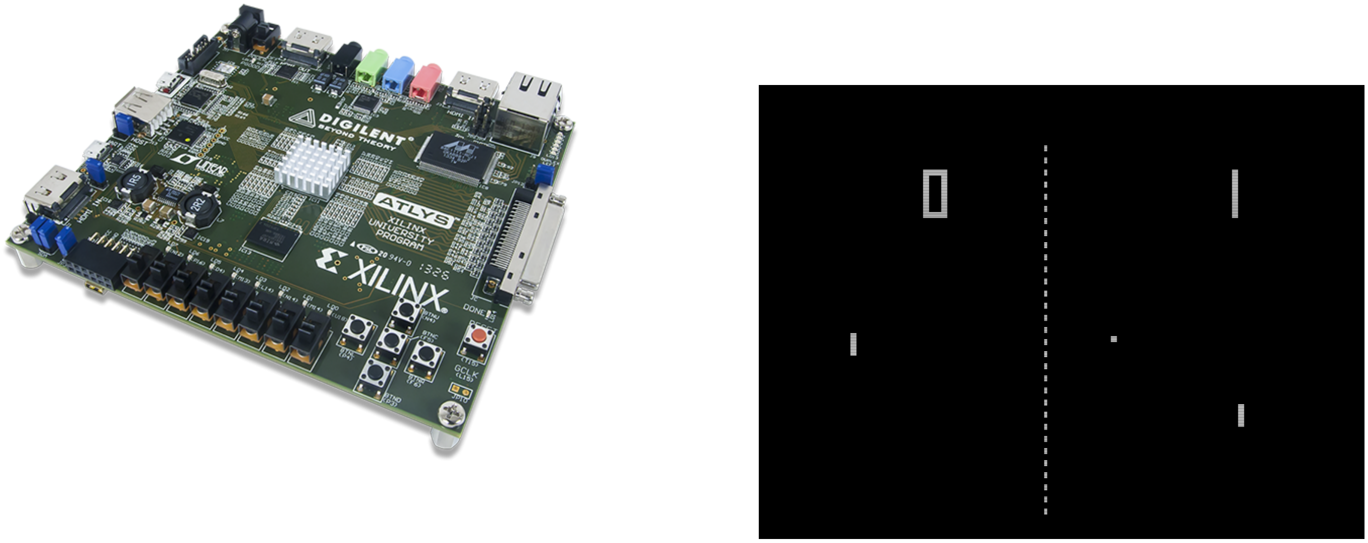
1 Topic

1.1 Brief Task Description

This project is about implementing the game Pong on the Atlys Spartan-6 FPGA board. Pong is a two dimensional multiplayer game that simulates table-tennis. Each of the two players controls an in game paddle by moving it vertically in order to hit a ball back and forth. A player scores a point when the opponent fails to return the ball.

We also took advantage of the built-in HDMI port and the AC-97 Codec to produce a better image and audio quality output.

Figure 1 shows a picture of the used board, and a screenshot of the (yet to be) realized game.



(a) Atlys Spartan-6 board

(b) Screenshot of the game Pong

Figure 1: Used board and screenshot of the game

1.2 Block Diagrams

1.2.1 Image Generator

Diagrams in the following figures were generated with the ”Create Schematic Symbol” tool from Xilinx ISE. They show the input and output of every module. Their respective functionality is explained in the next section.

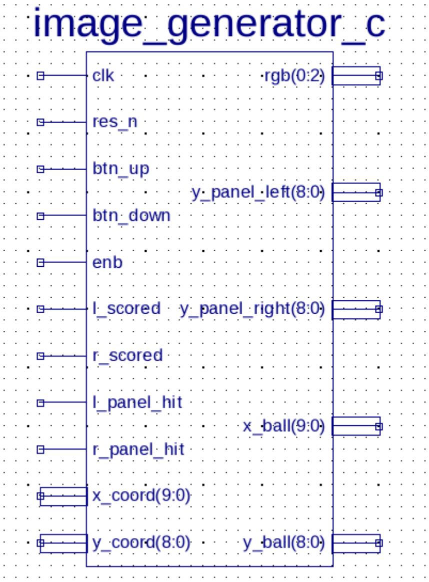


Figure 2: Schematic of Image Generator

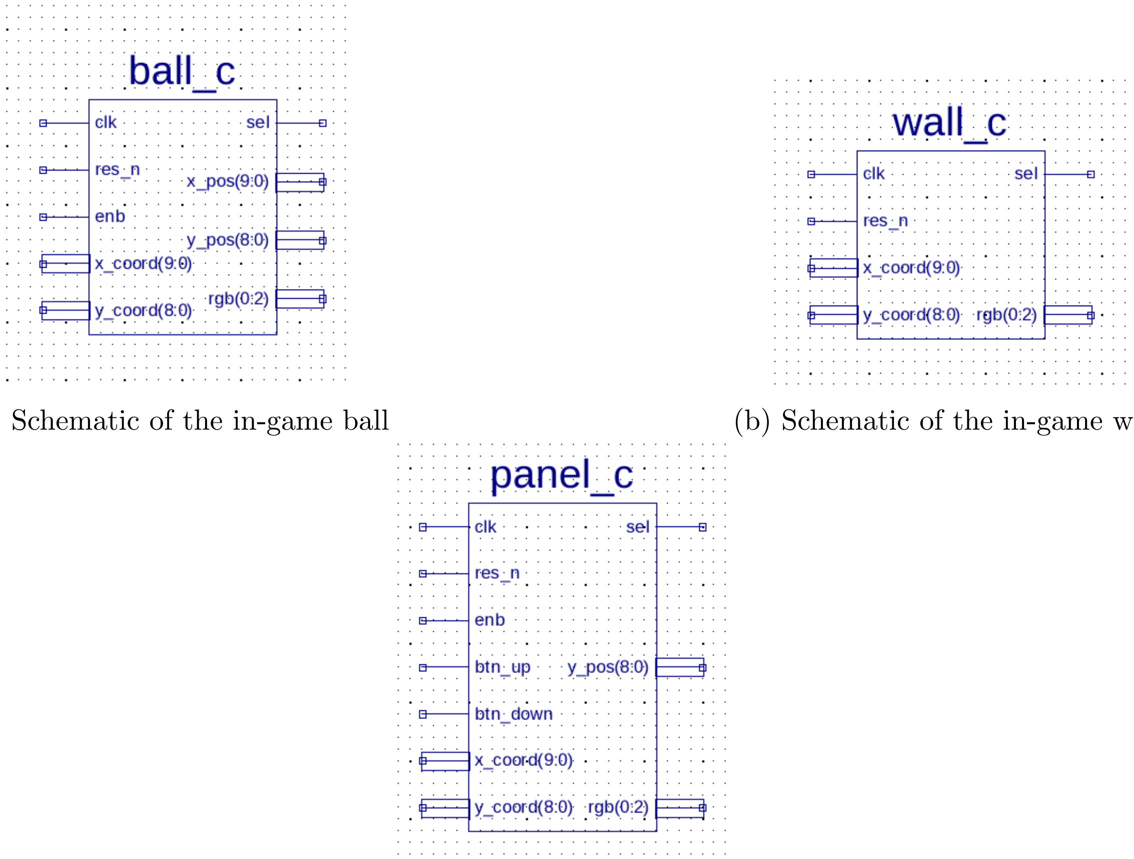
1.3 Functional Details

1.3.1 Image Generator

The Image Generator takes inputs from the players and outputs the video that can be displayed through the HDMI interface of the Atlys board. The panels shown in figure 3 are submodules of the module `image_generator_c`. The Image Generator calculates the movement of the ball and the two panels, that are controlled by the players.

The movement of the ball is done by the `ball_c` module. (see next Section for more details on implementation). After a well determined time frame, the ball's movement direction is determined and the next `x_pos` and `y_pos` are either incremented or decremented.

The module `panel_c` determines the y-coordinate of on panel based on the player input. For instance, pressing `btn_up` increments the `y_pos` signal if the panel did not reach the top edge already.



(a) Schematic of the in-game ball

(b) Schematic of the in-game wall

(c) Schematic of the in-game panel

Figure 3: Schematics of the sub-modules of the image generator module

2 Implementation

2.1 Modules

2.2 Results

2.2.1 Synthesis and Implementation results

2.3 Problems

3 Assessment

4 Summary

5 Attachment