

EDA385,  
Design of embedded system  
EyeToy™ clone on Nexys 3 FPGA board

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# 1 Brief description of functionality

The purpose of this project is to develop a camera-interactive game in the style of the early EyeToy™ games, released for the PlayStation 2™. To play the game, the player stands in front of the camera while looking at the monitor, and moves to hit (or avoid) objects on the screen. The resulting image of the player and computer generated objects is processed to detect points of intersection.

# 2 I/O Processes

The Camera is a VModCamera, and it is connected to the Nexys3 FPGA-board via VHDCI/VHDC (the documentation is ambiguous on this). A special IP to be used in order to control the camera, since the camera is quite complex.

VGA will be used to display the image on the monitor. A VGA-controller will have to be designed so that the generated images can be displayed correctly. To start a game, the buttons or switches on the FPGA-board are to be used. It is not yet decided how this will be implemented, but the intention is to keep it as simple as possible.

Communication between the processor and the different hardware blocks will be over FSL. Ideally, as few links as possible will be used in order to minimize waiting.

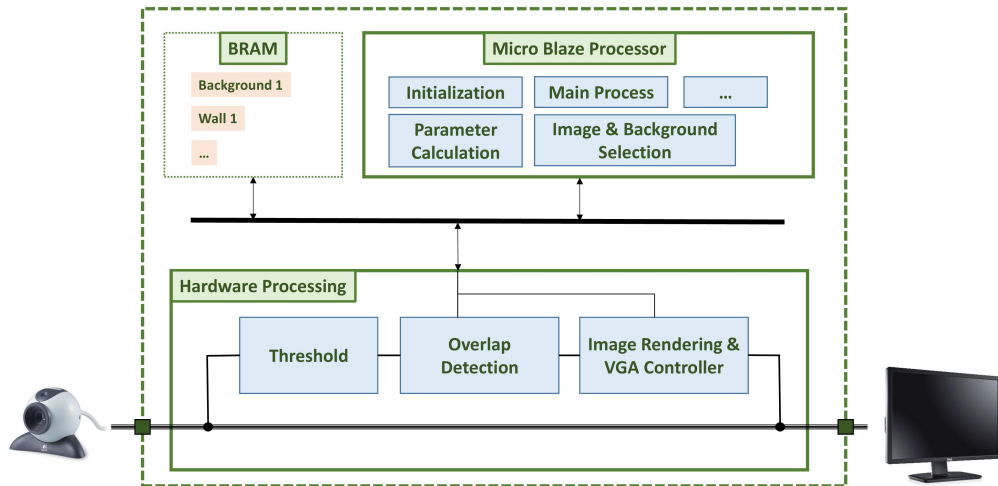


Figure 1: HW/SW Architecture

### **3 Constraints**

The biggest constraints when working with images are memory and throughput. The Nexys board does not feature a lot of memory for saving images and perform calculations on them. In this project we will try to avoid saving images and try to compute them “on the fly”. This will reduce the memory needed but increase the load of the processor. This will need to be carefully monitored so that we achieve a decent throughput in the system.

### **4 Possible Improvements**

- Color Correction - Not require a background of a single color
- Frame Rate - Higher frame rate so the game looks smoother
- Resolution - Higher resolution
- Sound - Audio feedback on completed/failed objectives in-game

Table 1: My caption

	Week 1	Week 2	Week3	Week 4	Week 5	Week 6	Week 7	Week 8
Planning								
Camera Test								
Hardware								
Software								
Model								
Memory								
Image Correction?								
Report								

## 5 Work Plan

The first week will be dedicated to planning the project. The following weeks will consist of testing the camera, designing the hardware and software and developing a model to create the dynamic parameters for the image threshold. The report will be started week 4 and run parallel with the implementation of the game. Below is a rough estimate of the time schedule.

Work will be divided between the group members when possible. For instance, hardware and software can be developed in parallel. As this project can be quite hardware-heavy (Camera-controller, VGA-controller), the Hardware side of the project will likely have to be divided as well.