
Light Gun - FPGA VGA

PCS 3335 - Lab Digital A Proposta 12

Jogo “Light Gun” em FPGA

<https://github.com/D1S3LPH/LabDig2023-projeto-final-projeto-12>

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Endereço GIT:

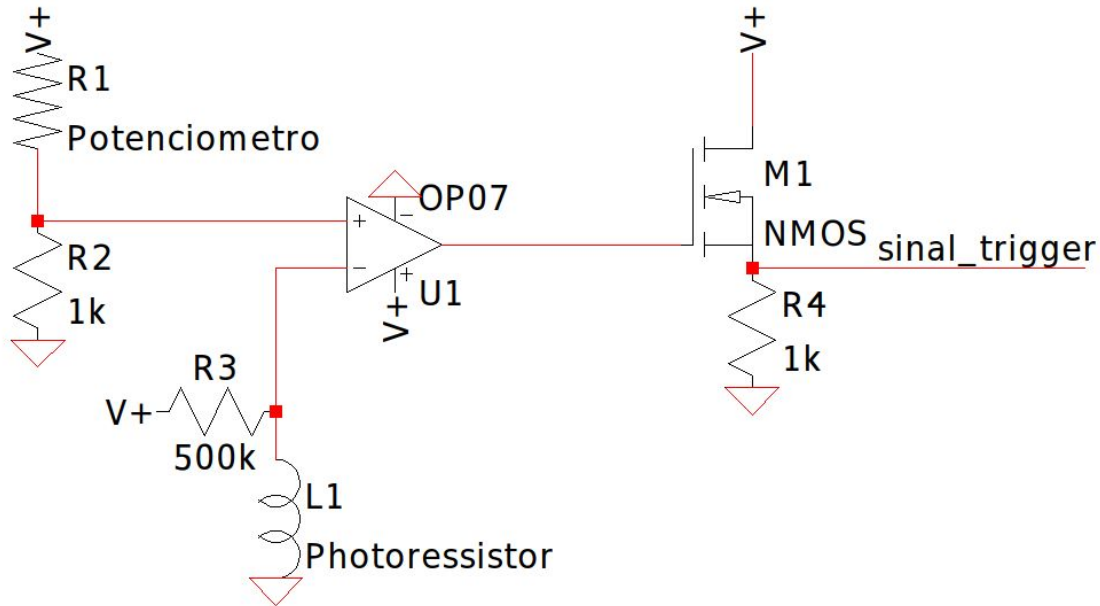
Princípio de funcionamento e HARDWARE

- > Ao se clicar no gatilho, o jogo faz com que apenas os alvos sejam iluminados , de forma com que se a mira estiver correta, o circuito sensor de luz deve enviar um sinal lógico high para a FPGA, indicando assim um tiro certo.
 - > Ao se detectar um tiro certo a Unidade de Controle, deve eliminar a aparição do objeto que recebeu o tiro.
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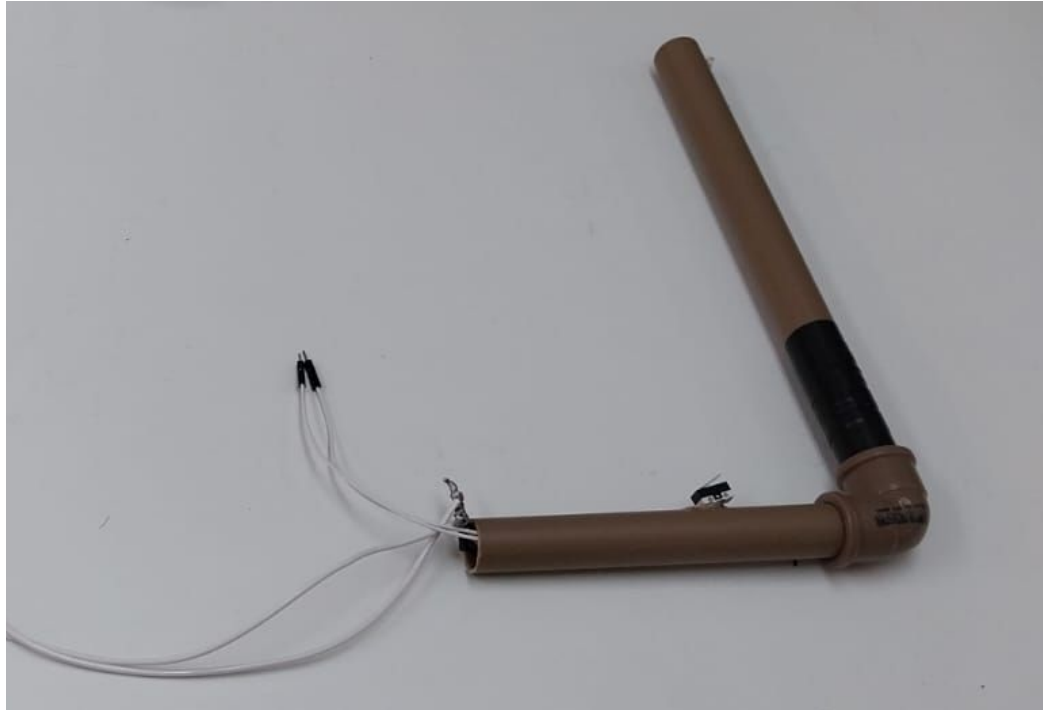
Princípio de funcionamento e HARDWARE

[Duck Hunt NES on a CRT TV - YouTube](#)

circuito de detecção de luz



Construção física da light gun



Protocollo VGA

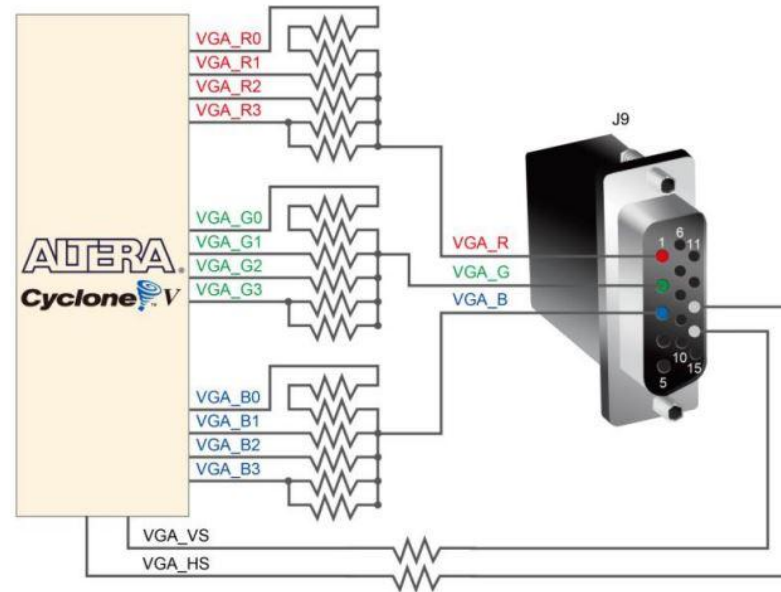


Figure 3-13 Connections between the FPGA and VGA

Protocolo VGA

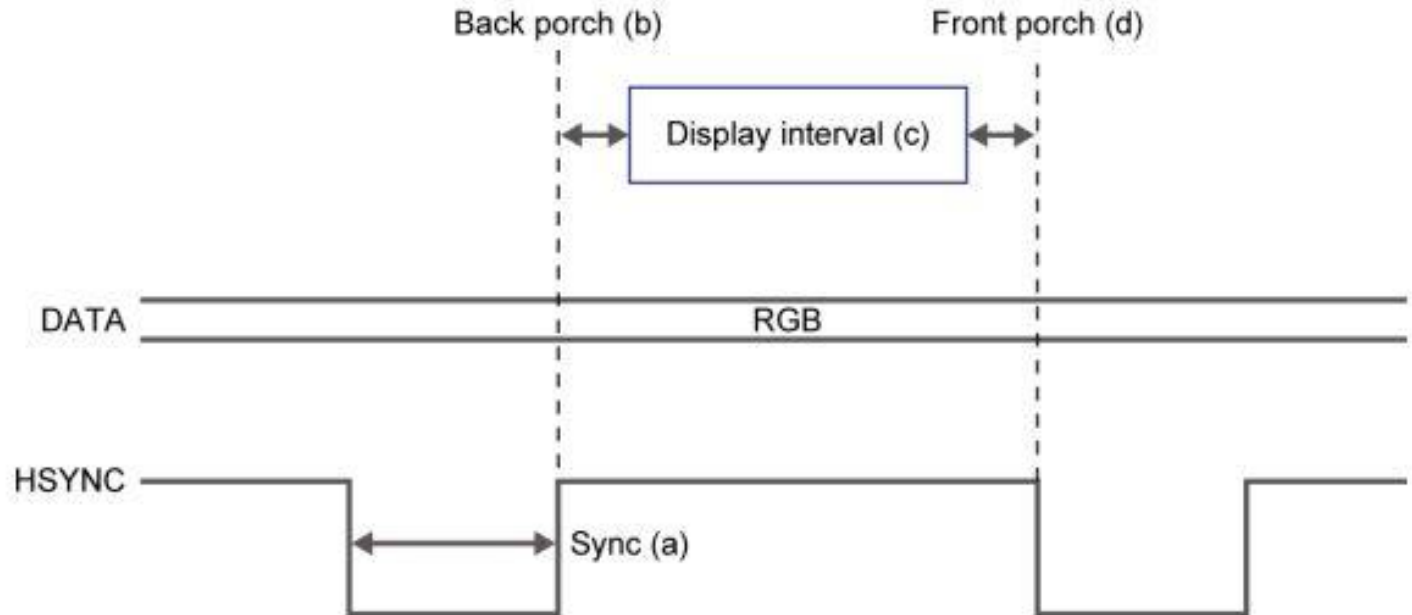


Figure 3-14 VGA horizontal timing specification

Protocolo VGA

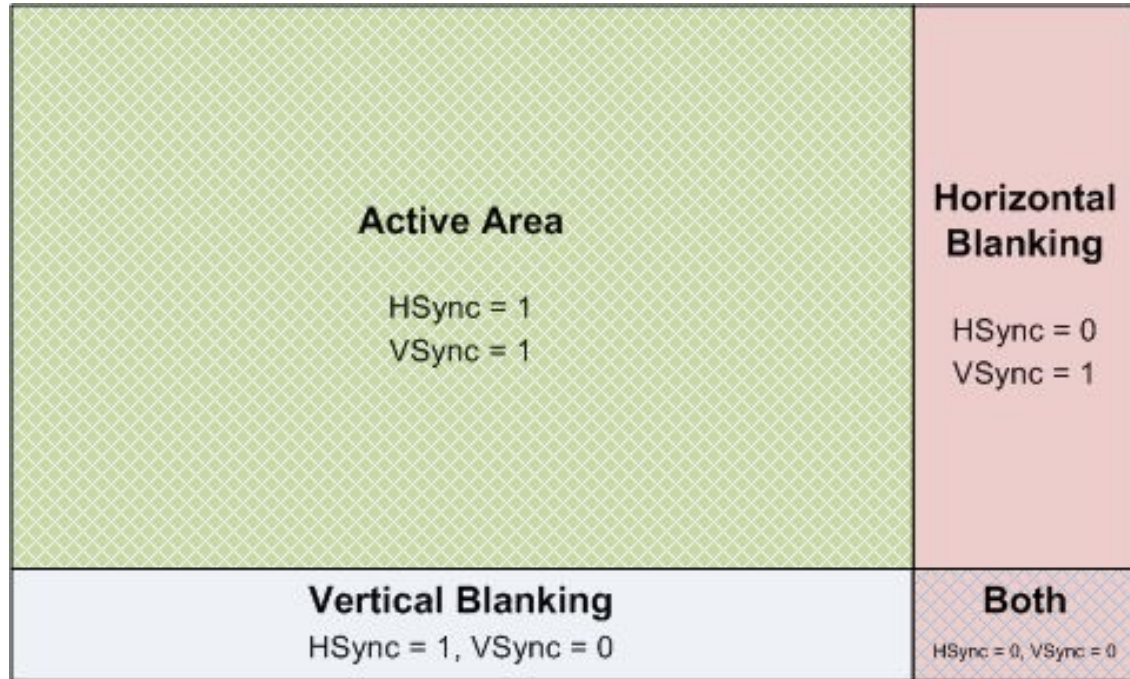
Table 3-8 VGA Horizontal Timing Specification

<i>VGA mode</i>		<i>Horizontal Timing Spec</i>				
<i>Configuration</i>	<i>Resolution(HxV)</i>	<i>a(pixel clock cycle)</i>	<i>b(pixel clock cycle)</i>	<i>c(pixel clock cycle)</i>	<i>d(pixel clock cycle)</i>	<i>Pixel clock(MHz)</i>
VGA(60Hz)	640x480	96	48	640	16	25

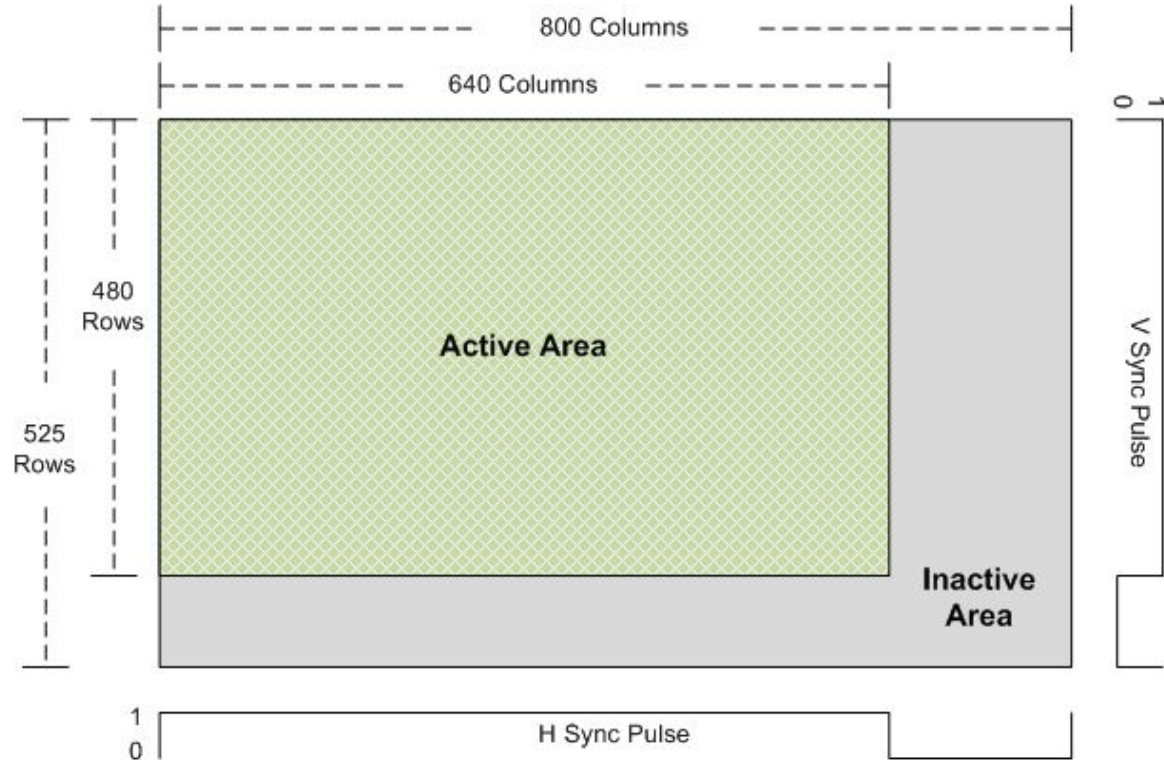
Table 3-9 VGA Vertical Timing Specification

<i>VGA mode</i>		<i>Vertical Timing Spec</i>				
<i>Configuration</i>	<i>Resolution(HxV)</i>	<i>a(lines)</i>	<i>b(lines)</i>	<i>c(lines)</i>	<i>d(lines)</i>	<i>Pixel clock(MHz)</i>
VGA(60Hz)	640x480	2	33	480	10	25

Protocollo VGA



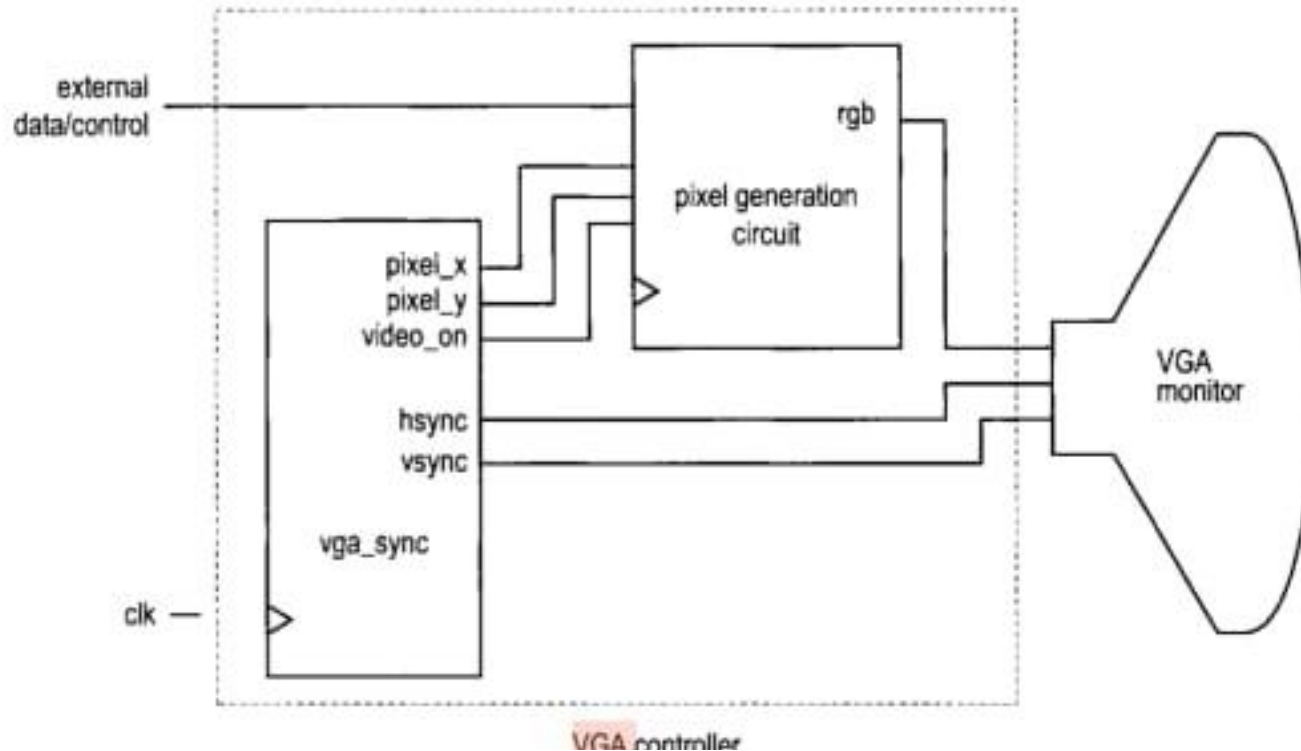
Protocollo VGA



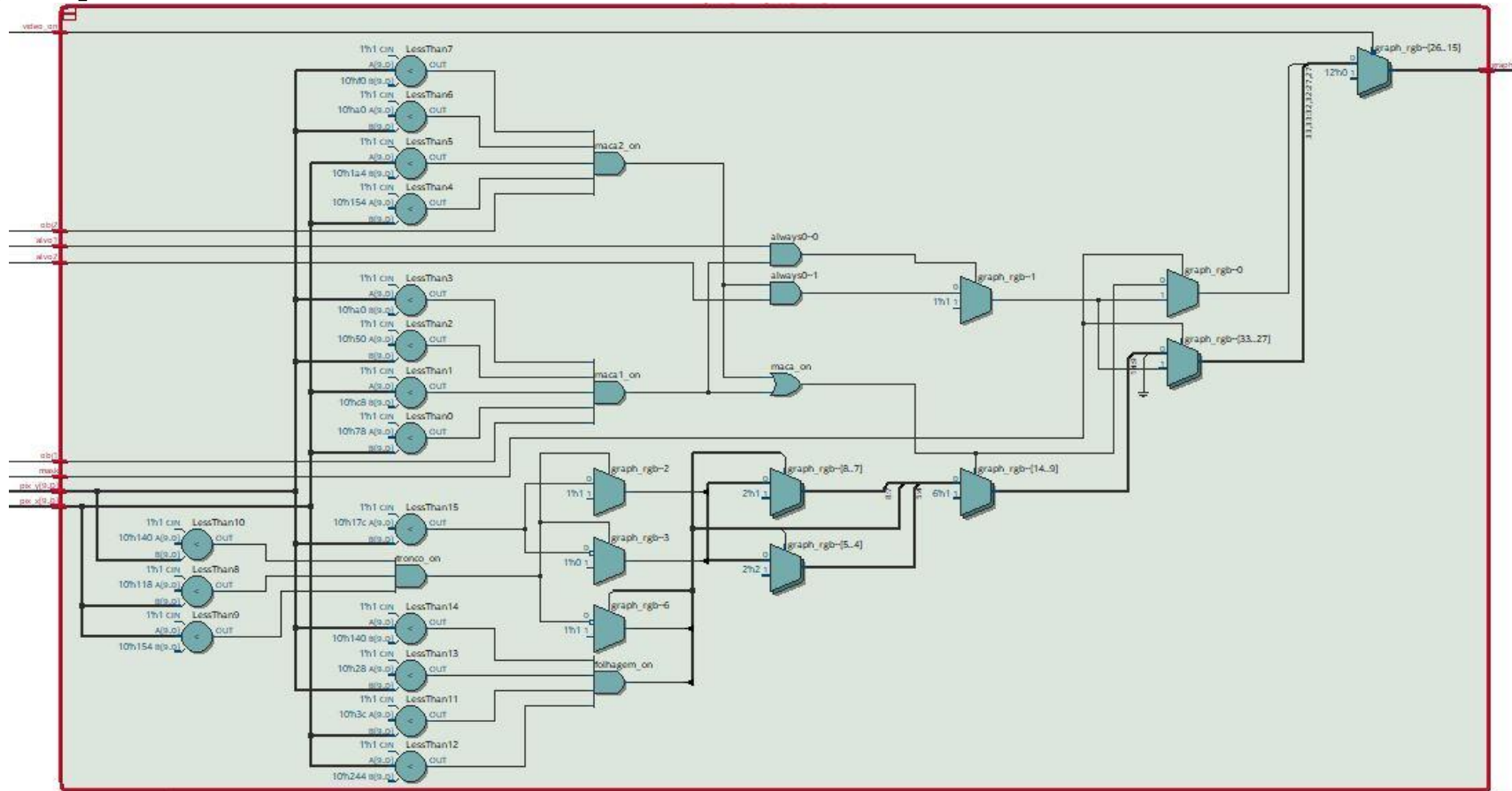
Protocolo VGA

VGA Timings using 25 MHz Clock		
Line/Frame Part	Horizontal Pixels	Vertical Lines
Whole Area	800	525
Visible Area	640	480
Front Porch	18	10
Sync Pulse	92	2
Back Porch	50	33

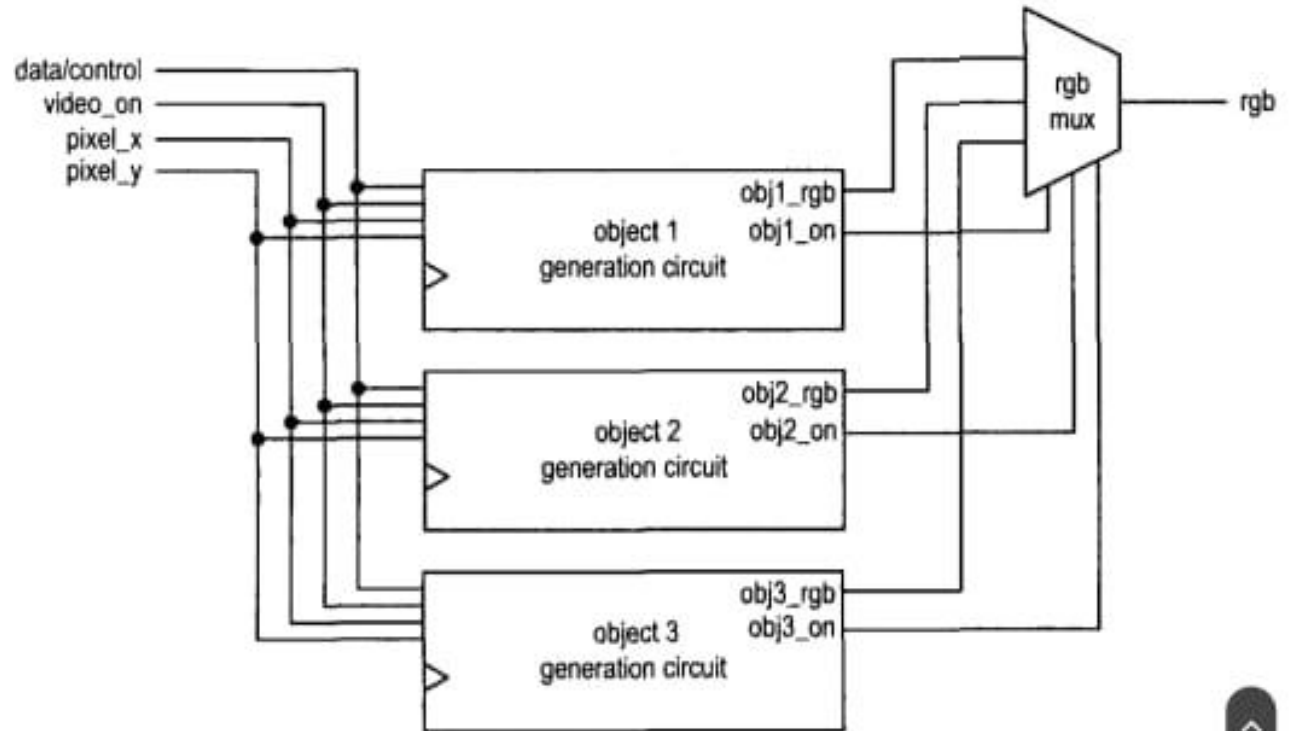
vga_sync.v



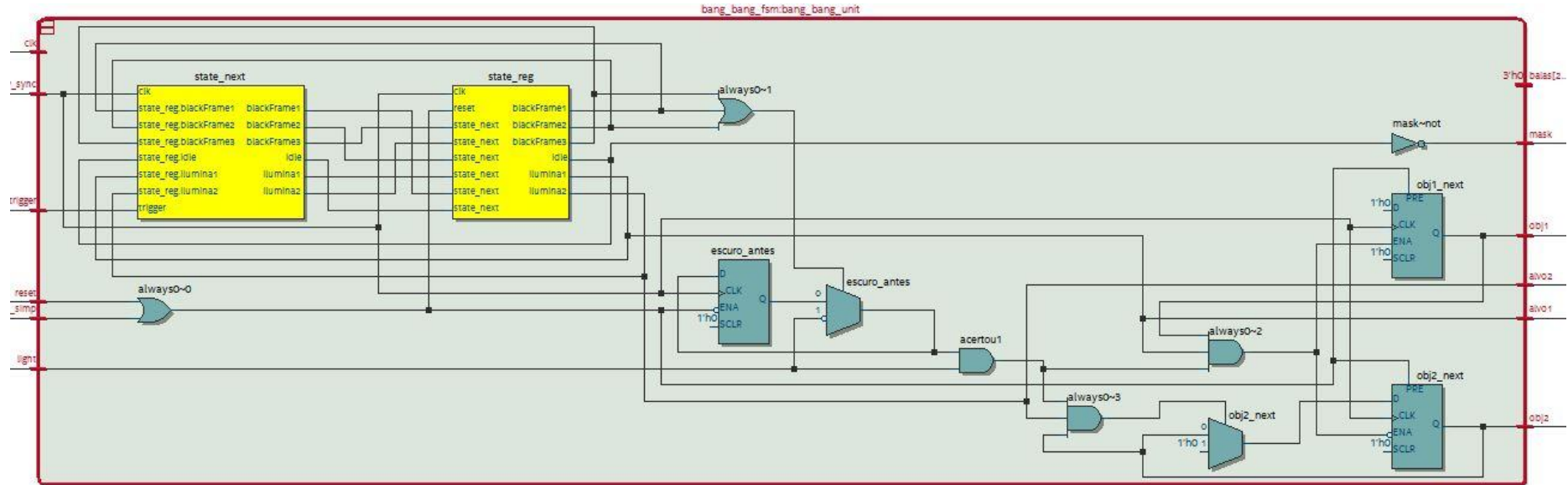
graph_circuit.v



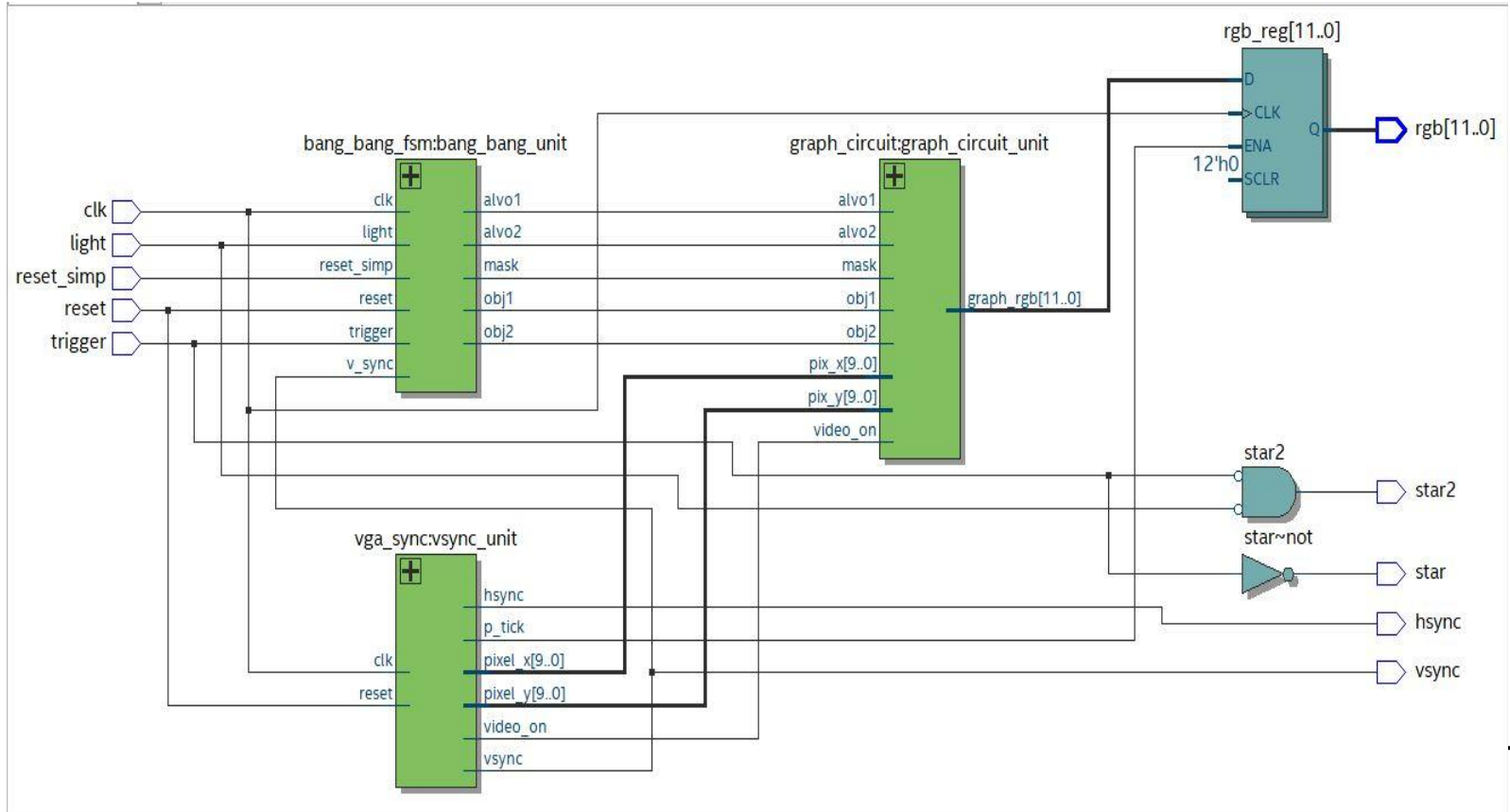
graph_circuit.v



bang_bang_fsm.v / RTL



graficos_top.v / RTL



Link GITHUB

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