Vexriscv SoC with UART and AXI-GPIO

GPIO LED application code running on a Vexriscv. This design contains a Vexriscv processor, ON chip ram, GPIO and UART.

Instructions:

You can follow the below steps to generate the designs and simulate the application on Verilator.

Generate Verilog for the LiteX design (No Simulation)

```
litex_sim --cpu-type vexriscv --axigpio --no-compile-gateware
```

Generate and Simulate the verilog for the LiteX design

Here we simulate the GPIO LED example using litex_sim_rs script provided in the example design directory.

The following command generates your SoC:

```
~/litex_instll/litex_rs/Example_designs/Vexriscv_axi_gpio_led/litex_sim_rs.
py --integrated-main-ram-size=0x10000 --cpu-type=vexriscv --axigpio --no-
compile-gateware --sim-debug
```

Generate binary for the application code

Run the following command to generate .bin file:

```
python3
~/litex_instll/litex_rs/Example_designs/Vexriscv_axi_gpio_led/test/demo/dem
o.py --build-path=build/sim
```

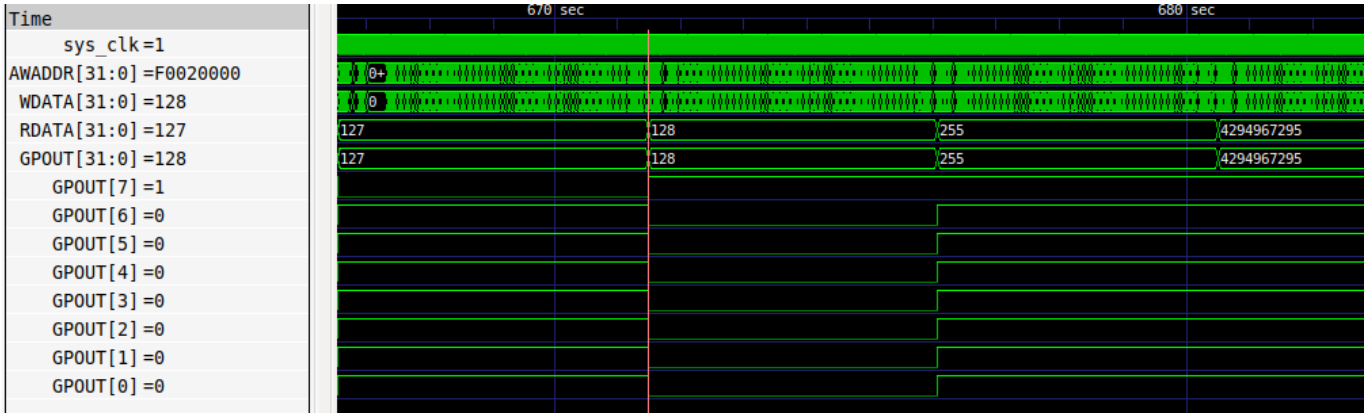
Simulating the application using Verilator

Run the following command to execute your application code onto the processor:

```
~/litex_instll/litex_rs/Example_designs/Vexriscv_axi_gpio_led/litex_sim_rs.
py --integrated-main-ram-size=0x10000 --axigpio --cpu-type vexriscv --ram-
init=demo.bin --sim-debug
```

```
--============= Liftoff! ===============--

WELCOME TO LITEX-RS
Jun 23 2022 12:37:47

<DUMP ON>
0 to 6 LEDs glowing represents 127

Only 8th LED glowing represents 128

0 to 7 LEDs glowing represents 255

ALL LEDs glowing represents 0xFFFFFFFF
<DUMP OFF>

======================
------TEST-STATUS-----
======================

TEST PASSED

======================
---------END----------
======================
```

Output:



Application

This test performs the write operations on GPIO LEDs. This can be seen on waves(VCD) and hardware.

Compile design for a Gemini FPGA Device

Source Raptor for compilation

Raptor needs to be sourced before using Gemini.py

Compiling a design on Raptor for Gemini device

```
~/litex_instll/litex_rs/Example_designs/Vexriscv_axi_gpio_led/gemini.py --
toolchain=Raptor --device=gemini --cpu-type=vexriscv --axigpio --build
```