

LEON3 Emulator for SCOORE (Santa Cruz Out-of-Order RISC Engine)

Kristy Vu, Professor Jose Renau, Shivkumar Shivaji

Abstract:

In our immediate project, an emulator that is binary compatible with SCOORE was to be designed. QEMU, LEON3, and UART are used to create the emulator used in testing the designed machine. The available open source code of QEMU was used to emulate LEON3 architecture in order to test the SCOORE processor of UCSC. LEON is a new architecture based on SPARC created in 1997 when Giri Gaisler bought a SPARC license from Sun Microsystems. Leon is very similar to SPARC. However, hardware access and memory management are different.

OUTLINE:

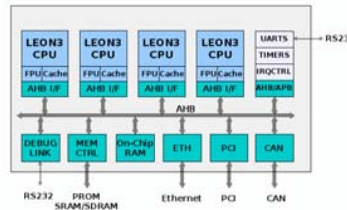
QEMU
LEON3
UART

UART converting data from parallel to serial for transmission and from serial to parallel on reception provide additional circuits for signals that can be used to indicate the state of the transmission media.

QEMU:

QEMU is a CPU/System emulator that runs on a variety of platforms (Unix, Linux, Windows, Mac) and is able to emulate many different architectures. QEMU can be seen as a virtual machine that acts like computer hardware. In such a virtual machine, any OS (Operate System) like Linux, Windows, BSD can be installed.

• How UART (Universal Asynchronous Receiver/Transmitter) works on LEON and QEMU interface:



Conclusion:

More time is needed to debug the fast input / output problem and to make sure that the outputs are consistent. After fixing these problems, the emulator should be good to be used in testing SCOORE system.

LEON3:

For SCOORE project, LEON3, a synthesizable VHDL model of 32-bit CPU compliant with the SPARC V8 architecture, is emulated. We want to use this to test the SCOORE processor of UCSC.

Results:

The emulator is mostly working except for fast Input / Output operations. Another problem is that when we run QEMU many times, the outputs at different times are not identical.