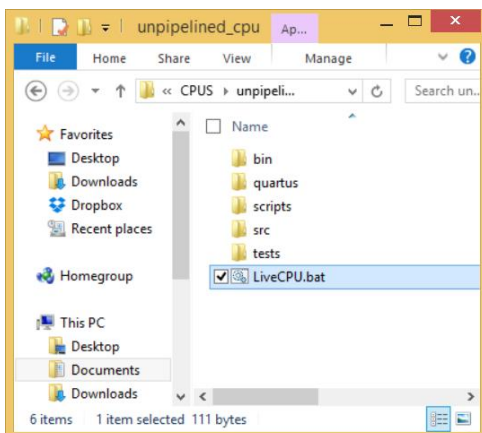# LiveCPU – Advanced Debugging

1   DESCRIPTION

LiveCPU is a ModelSim extension that has been developed by our engineering team. It allows the CPU to be simulated in live mode, where instructions can be injected directly into the CPU via the ModelSim command line. This eliminates the need to perform tedious and repetitive tasks every time a developer wants to examine the behavior of an instruction inside the CPU.

Prior to the existence of this feature, testing an instruction required the developer to execute the following tasks:

1. Write the test instructions in a file.
2. Assemble the file.
3. Load the binary code into the CPU.
4. Simulate.

This series of steps has been replaced with the more simple procedure below:

1. Launch LiveCPU by double-clicking on LiveCPU.bat. This will open a new ModelSim window and initialize the LiveCPU environment.
2. Execute instructions as desired via the ModelSim command line, using the *asm* command.

2   HOW IT WORKS

When the *asm* command is used in this way, it executes several steps behind the scenes:

1. The CPU's live_mode input port is asserted. This prevents the CPU from fetching its instructions from memory.
2. The assembler is called to convert the instruction text into executable binary code.
3. The binary version of the instruction is written onto the CPU's live_instr input port.
4. The CPU grabs the injected instruction as though it came from memory and executes it normally.