DESIGNING A BYTE-ENABLE MEMORY IN VERILOG AND SYSTEM-VERILOG

ABSTRACT:

Designing a Byte-Enable Memory in Verilog and System Verilog involves creating a memory module that allows for selective enabling of individual bytes within a wider data word during read and write operations. This functionality is crucial in systems where precise control over memory access and modification is needed, such as in embedded systems, processors, and digital signal processing applications. Byte-enable memory modules are essential components in digital systems, enabling fine-grained control over memory operations. It prevents the implementation of a byte-enable memory module using both Verilog and System Verilog. This optimizes memory usage and enhances performance in various applications, including embedded systems and data-intensive computing tasks.

Mostly all embedded memory blocks that are implemented as RAMs support byte enables that mask the input data for specific bytes, nibbles, or bits of data. This process begins with defining the memory's architecture, including parameters such as word size, memory depth, and the number of Bytes enabled. In Verilog, the implementation involves creating a memory array and developing logic for handling byte-enable signals during read and write operations. It writes logic ensures that only the selected bytes are modified, while the read logic provides the correct data bytes based on the enable signals.

In this proposed system, system Verilog extends its capabilities by introducing advanced features such as type definitions, enumerations, and packed structures, which facilitate more efficient and readable code. The implementation in System Verilog takes advantage of these features to streamline the design process, enhance code maintainability, and will improve simulation and byte-enable memory access efficiency, reduces power consumption, and enhances the flexibility of data handling in various computing systems.

Keywords: *Byte-enable memory, System Verilog, Memory array, Embedded systems, Memory-depth, Read and write operations.*

TEAM MEMBERS

Tammali Karthik (BU21EECE0100164)

P. Visweswara Rao (BU21EECE0100086)

Maria Punya (BU21EECE0100309)

Guide Signature