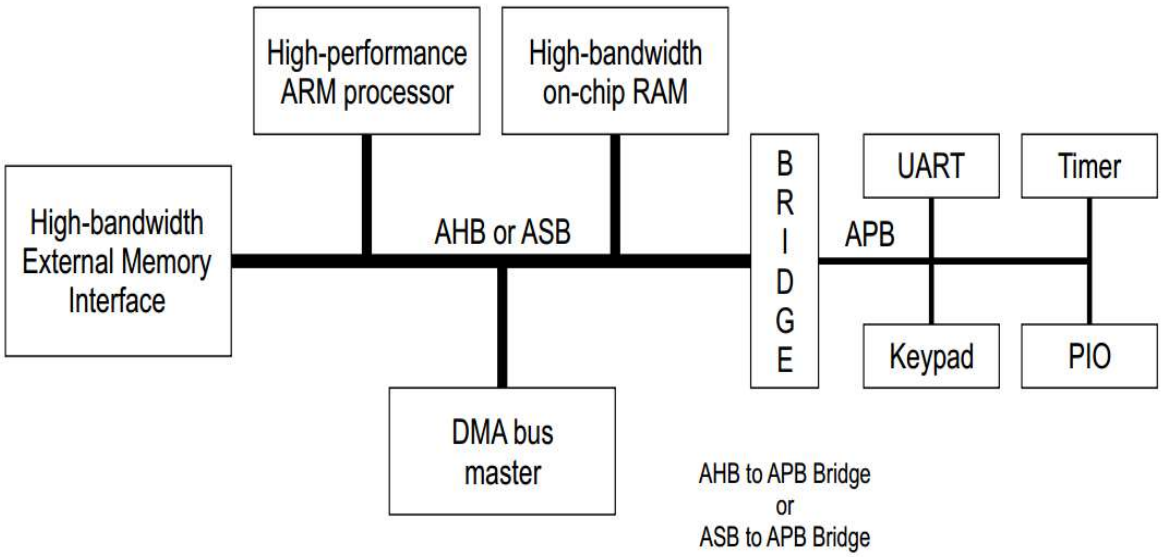
BATCH DI 55

REPORT
AHB-TO-APB BRIDGE

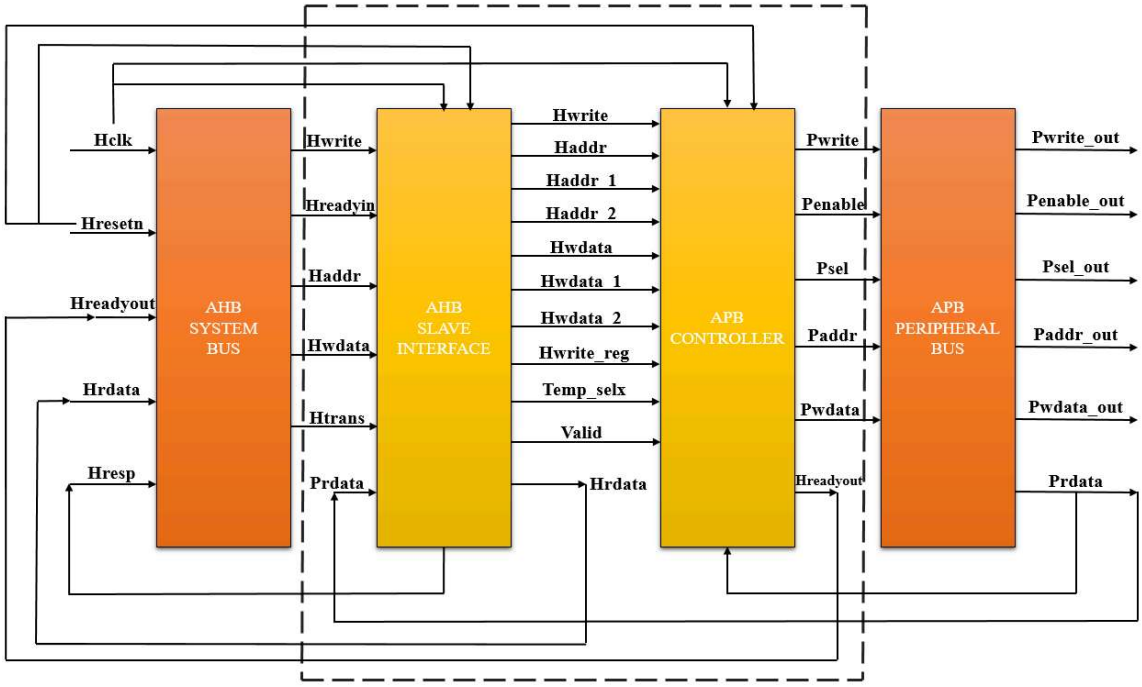
Architecture



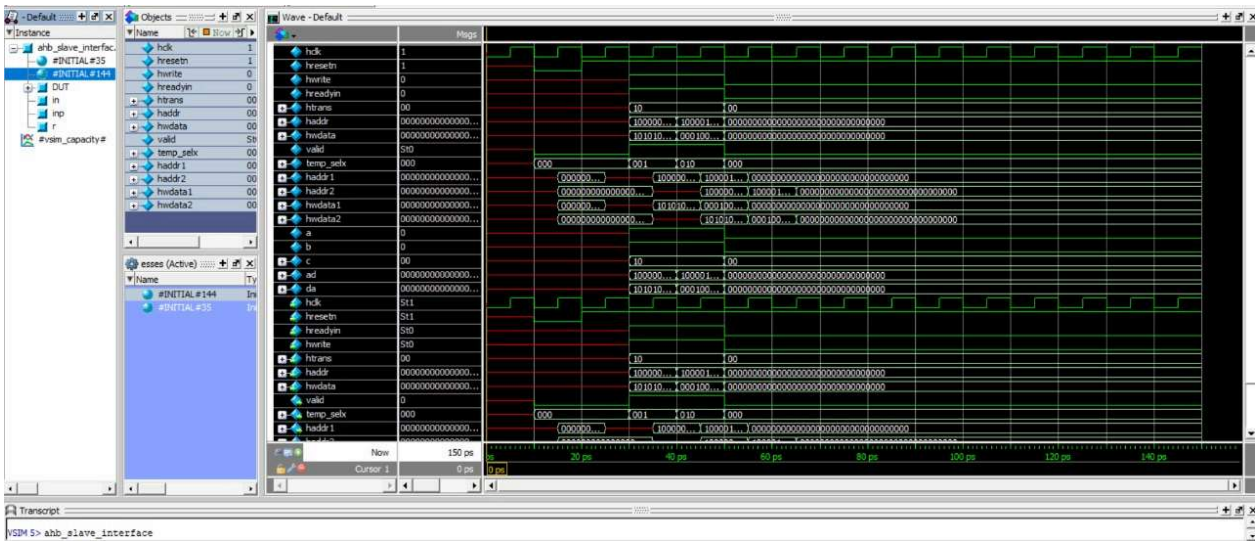
Introduction

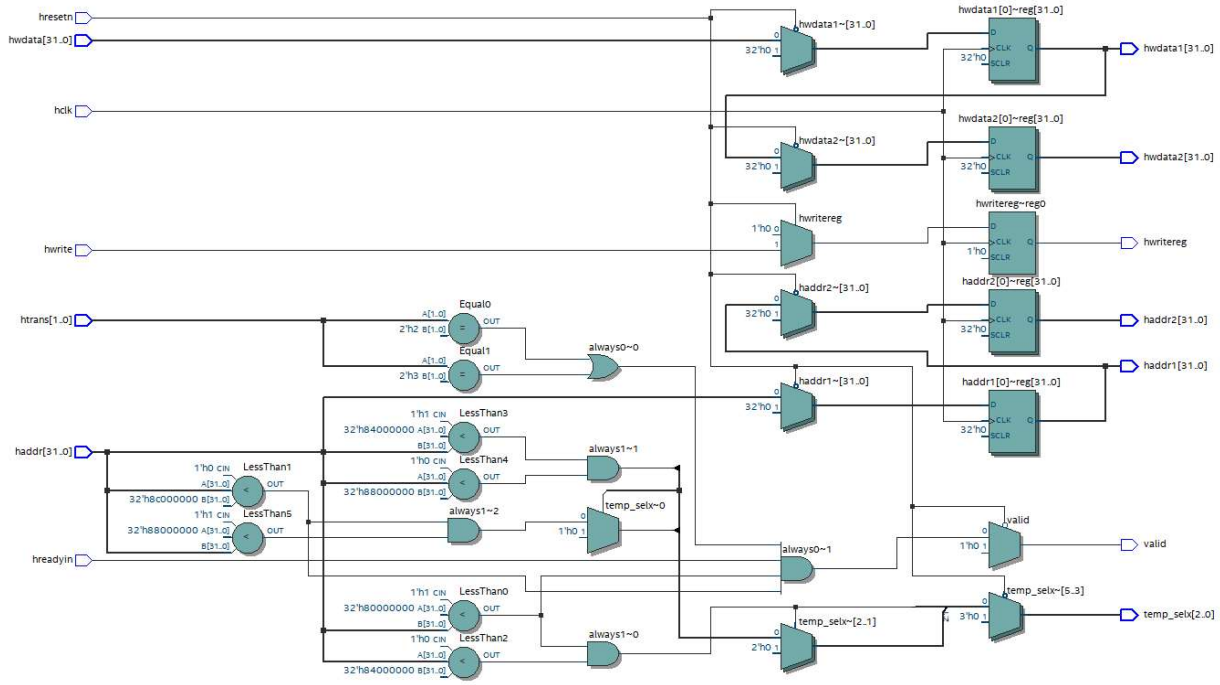
AMBA, which stands for Advanced Microcontroller Bus Architecture, is a communication standard developed by ARM to make it easier for different parts of a system-on-chip (SoC) to talk to each other. Think of it as a set of rules that help the processor, memory, and other components, like sensors or displays, work together smoothly. It includes different types of buses—like AHB for fast data transfer, APB for simpler, slower devices, and AXI for high-speed, advanced communication. By following AMBA standards, designers can build chips more efficiently and organized, reusing parts and connecting components without compatibility issues.

AHB-to-APB Bridge Block Diagram

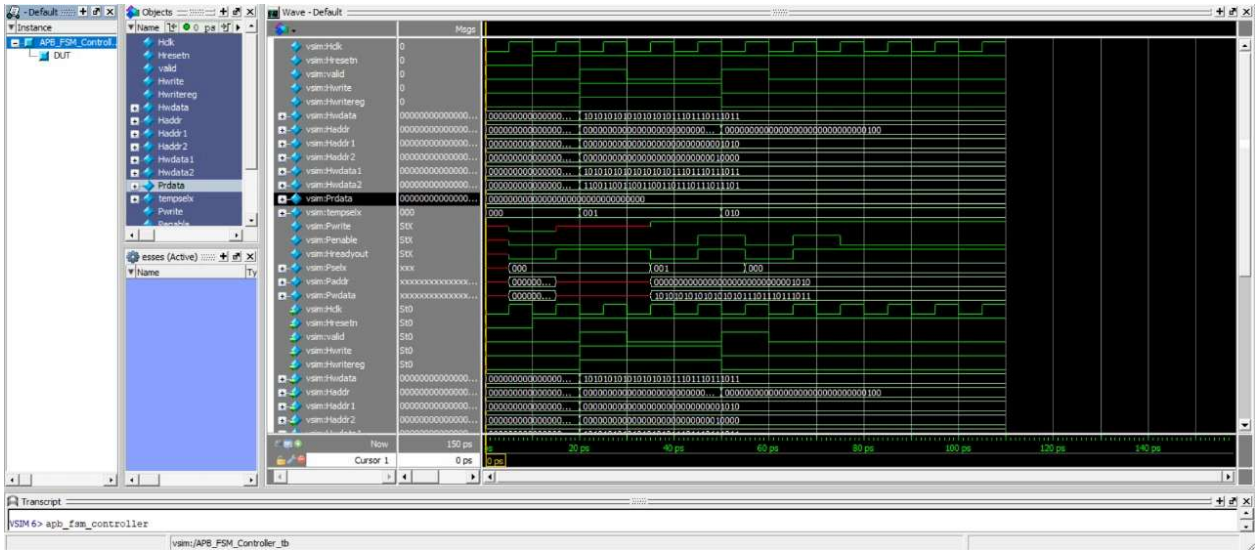


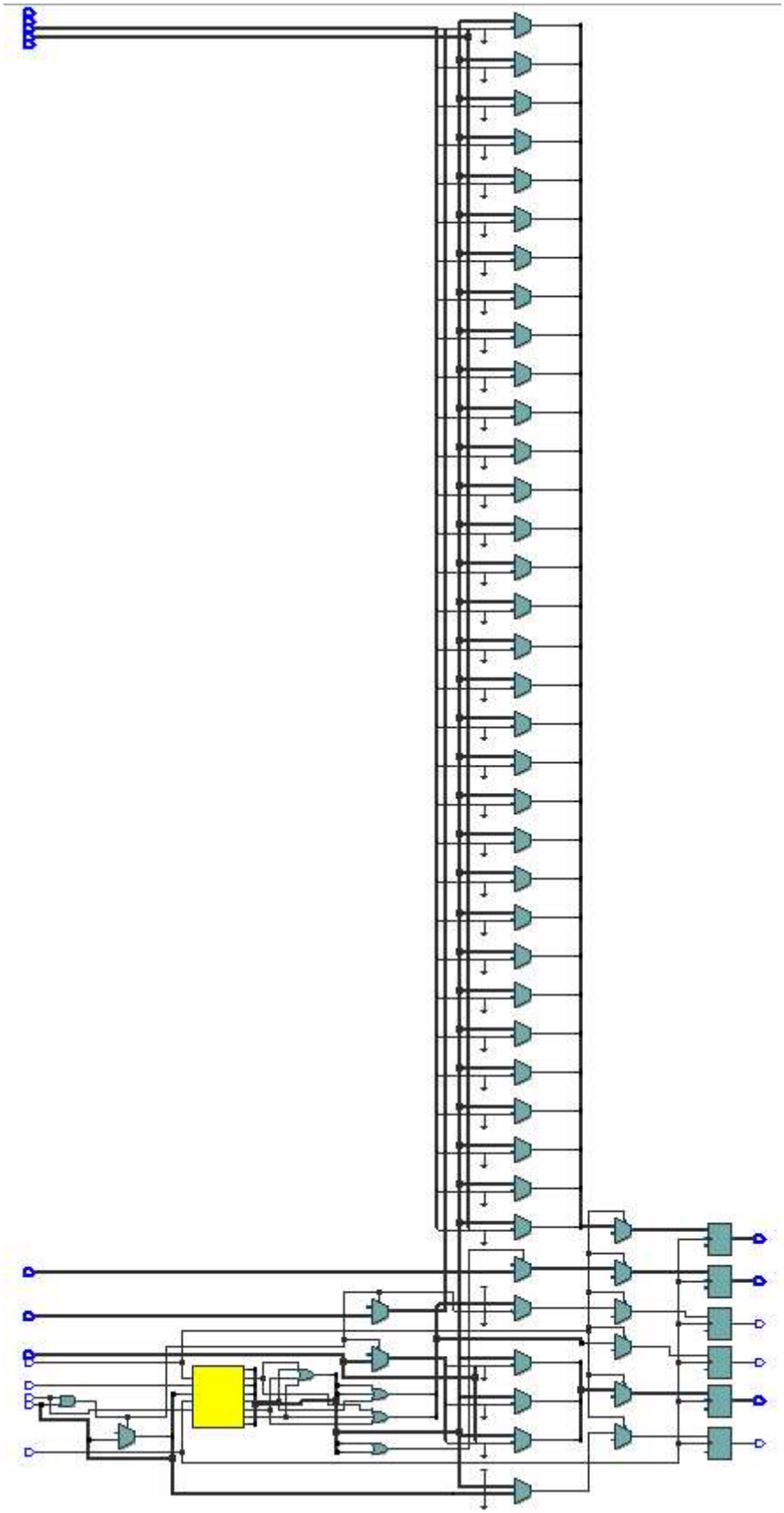
AHB Slave Interface



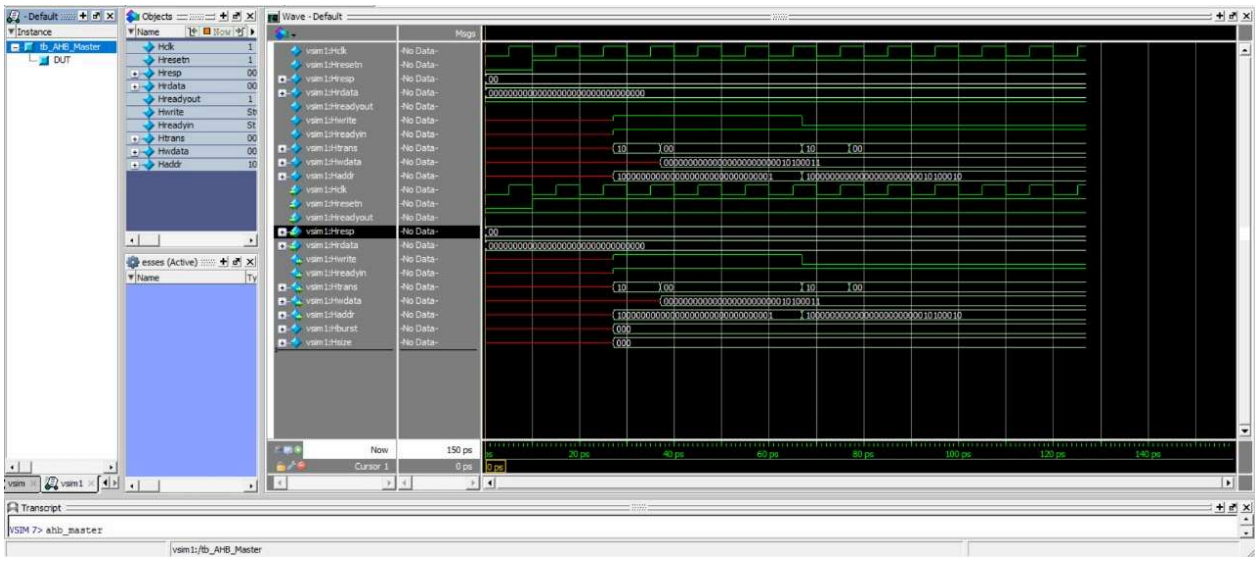


APB FSM Controller

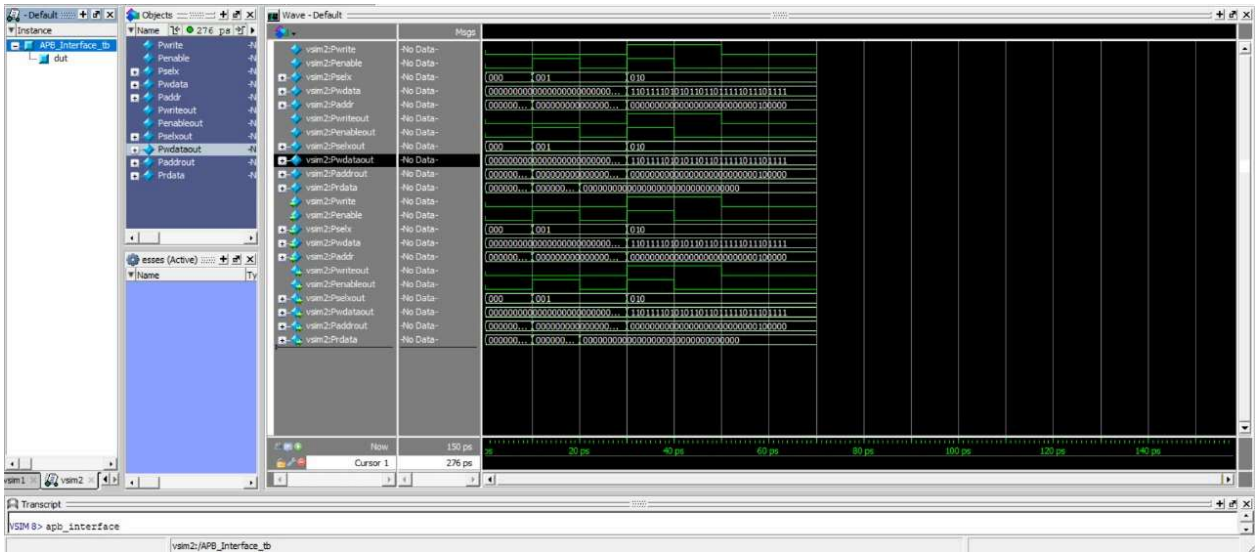




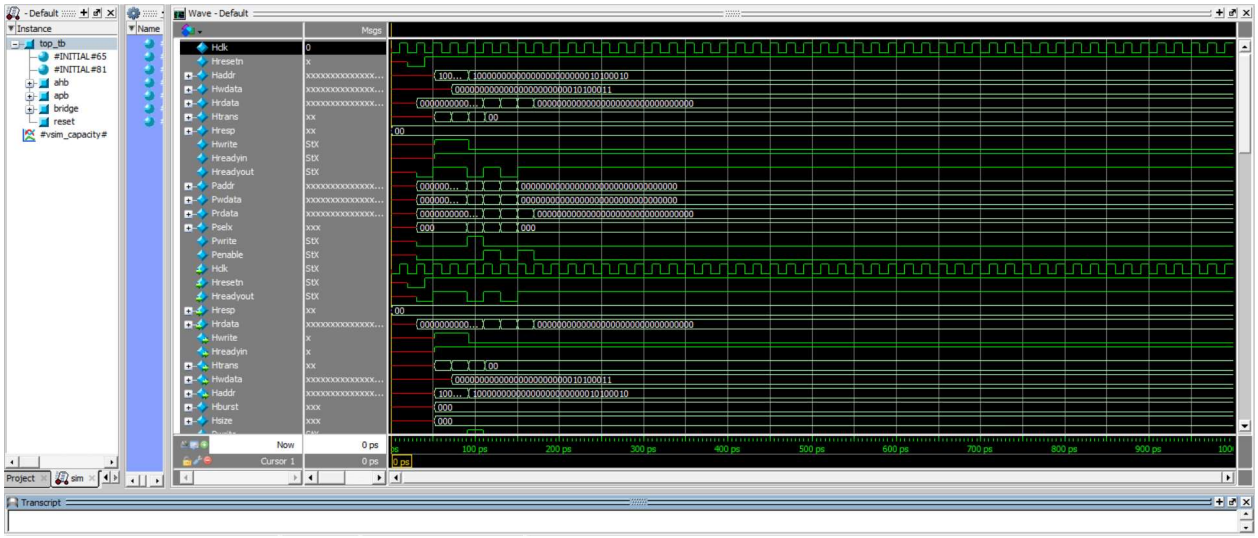
AHB Master



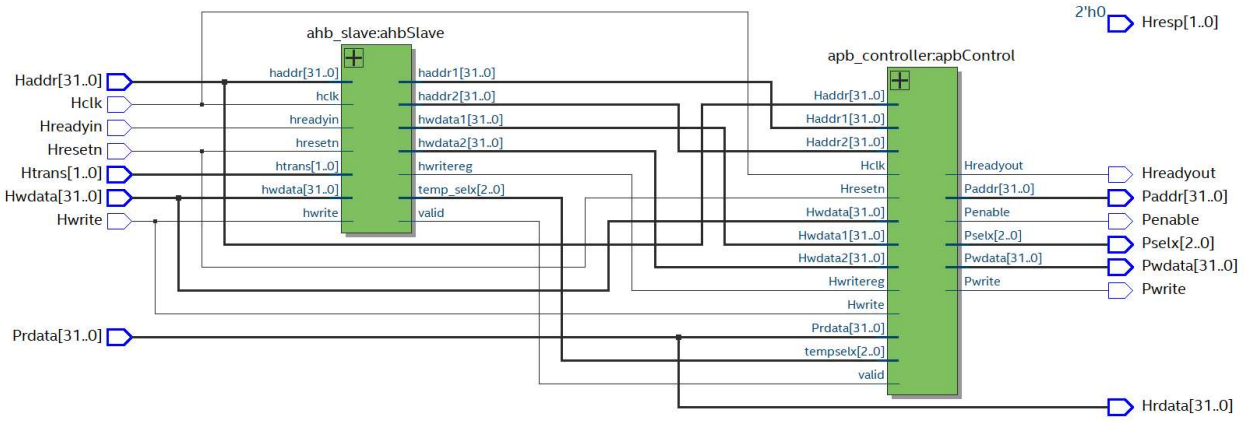
APB Interface



Bridge Top



Synthesis Model of AHB-to-APB Bridge



Conclusion

This project helped me understand how the AHB and APB protocols work together, and how a bridge manages their communication. I learned how to write Verilog code for both RTL and testbenches, and got comfortable building FSMs, adding pipelining, and handling control signals. Working through each module step by step — then putting everything together and simulating it — gave me a clear idea of how an actual SoC component is designed and verified. More than anything, it showed me how to approach digital design in a structured and hands-on way.

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