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BATCH : DI – 44

COURSE : VLSI DESIGN INTERNSHIP

PROJECT : AHB2APB BRIDGE

FACULTY : Sathya Priya Mam

ABOUT AMBA BUS ARCHITECTURE :

- AMBA stands for **Advanced Microcontroller Bus Architecture** . It is developed by ARM as an interface for their microprocessors . It is available in three standards – APB , AHB, AXI , ASB.
- The AMBA specification defines an on-chip communications standard for designing high – performance embedded microcontrollers .
- AHB stands for **Advanced High – Performance Bus**.
- ASB stands for **Advanced System Bus**.
- APB stands for **Advanced Peripheral Bus** .

ABOUT AHB BUS :

- It is for high – performance ,high clock frequency system modules .
- It acts as high – performance system **backbone bus** .
- It supports efficient connection of processors , on -chip memories and off – chip external memory interfaces with low- power peripheral .
- The ASB is an alternative to the AHB where some high-performance features are not needed.

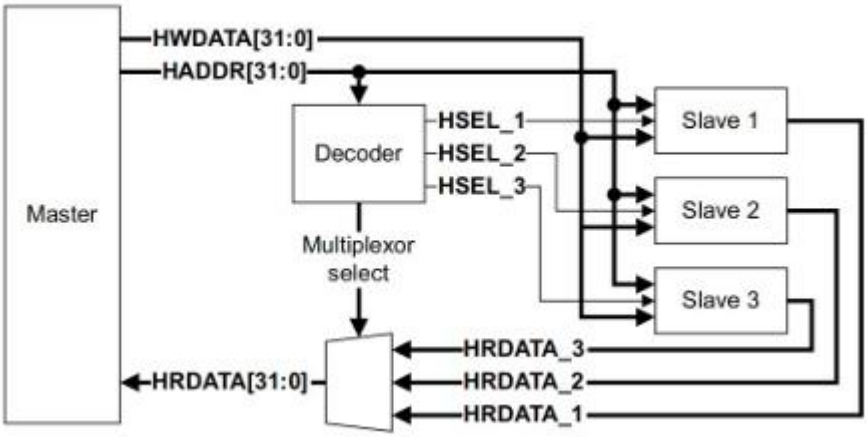
ABOUT APB BUS :

- It is for **low – power peripherals** .
- It is optimised for minimal power consumption and reduced interface complexity to support peripheral functions .
- It consists of a single bus master called the **APB bridge**, which acts as a slave on the AHB/ASB.
- Thus, the bridge is the interface between the high-performance bus(AHB) and the low-frequency peripherals(APB) .

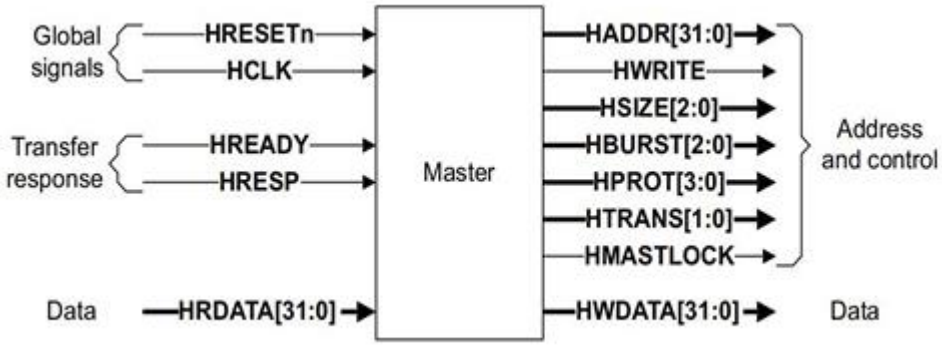
BLOCK DIAGRAM AND ARCHITECTURE

- Block Diagram

1.**AHB Master**

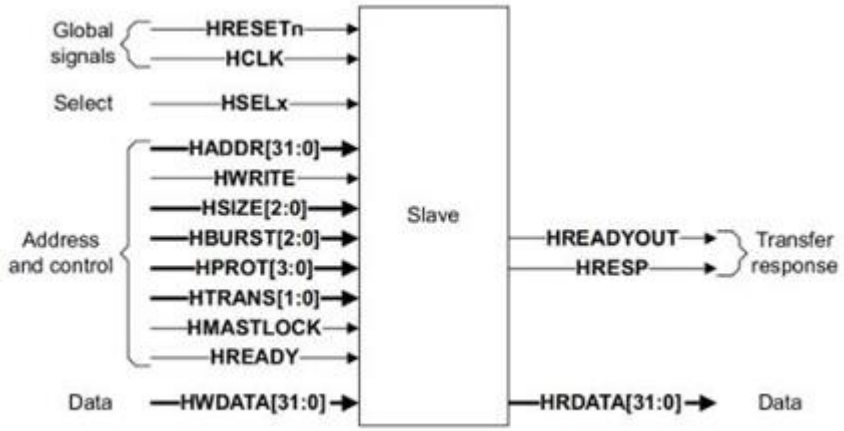


AHB Block Diagram

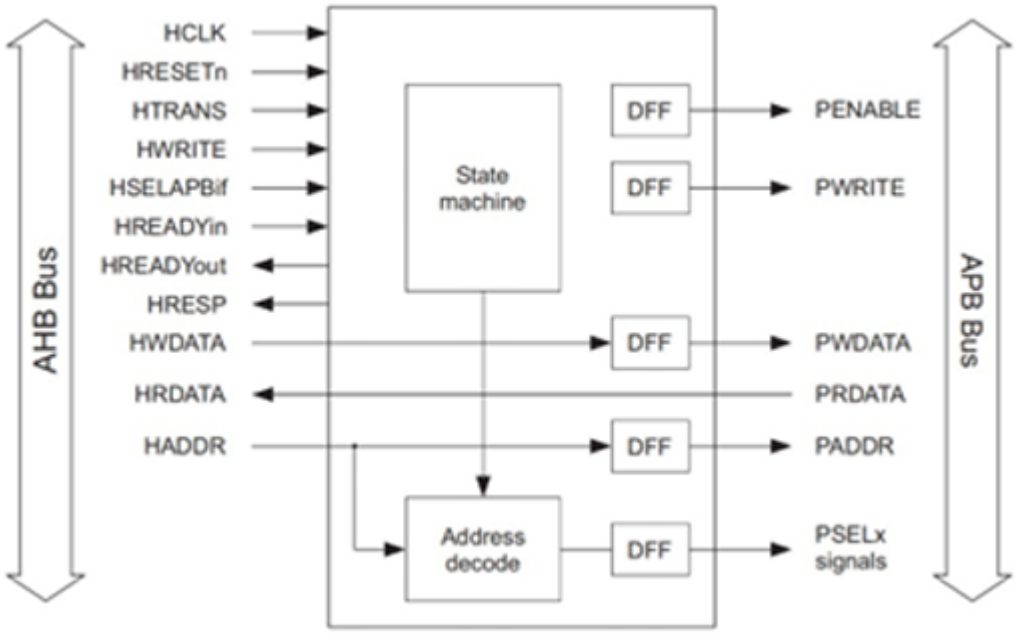


AHB Master Interface

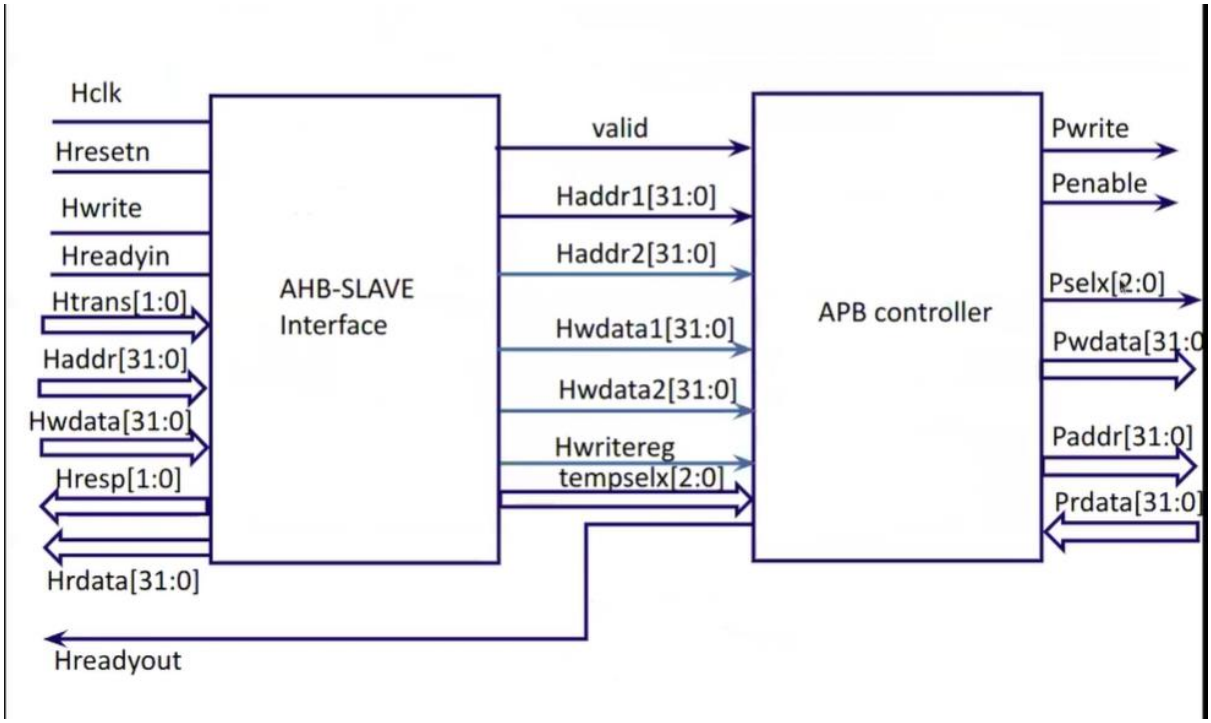
2.**AHB Slave Interface**



3.**AHB 2 APB Bridge Block Diagram**



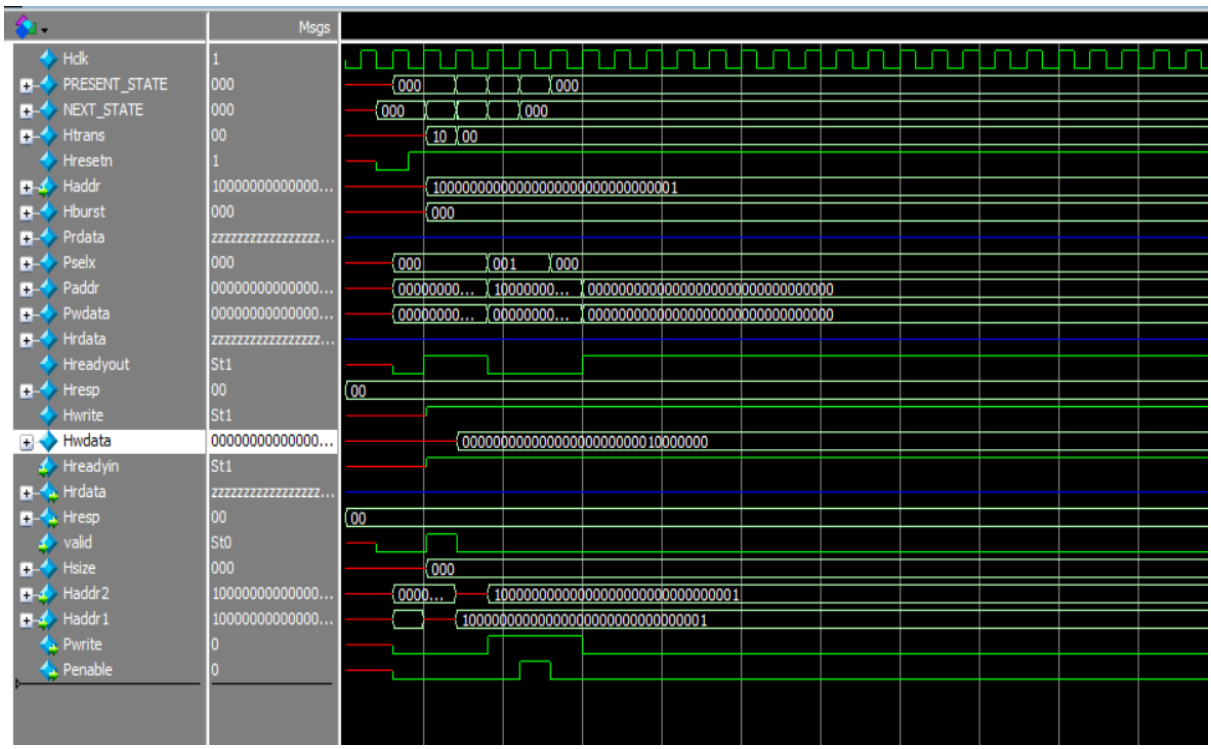
4.**Bridge Module**



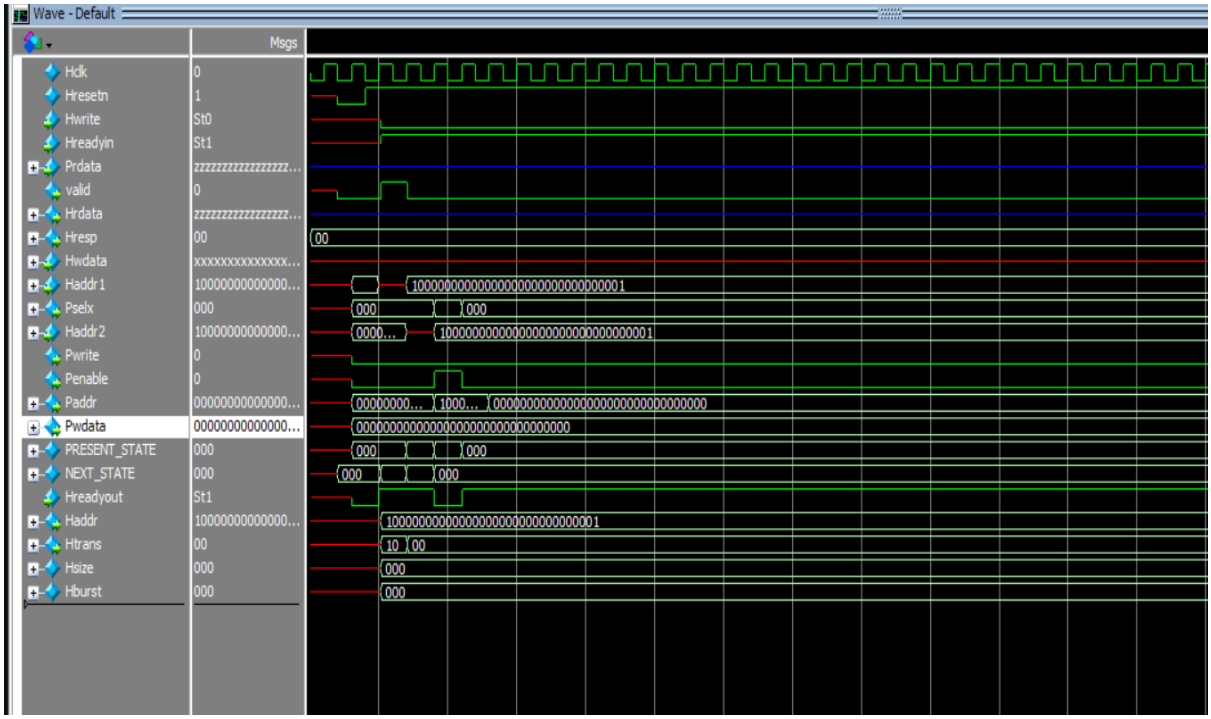
- The above figure shows the connection between **AHB slave interface and APB controller within the bridge .**

SIMULATION RESULTS OF ALL TRANSFERS :

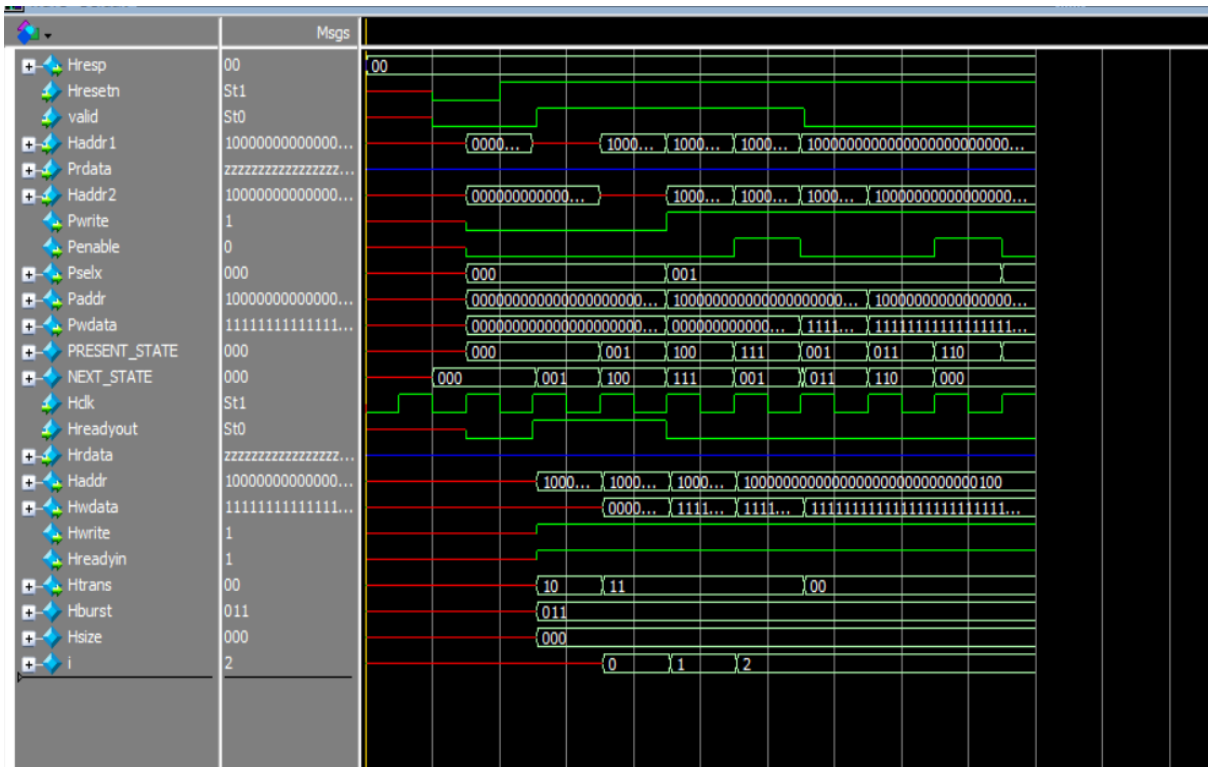
1.SINGLE_WRITE_TRANSFER



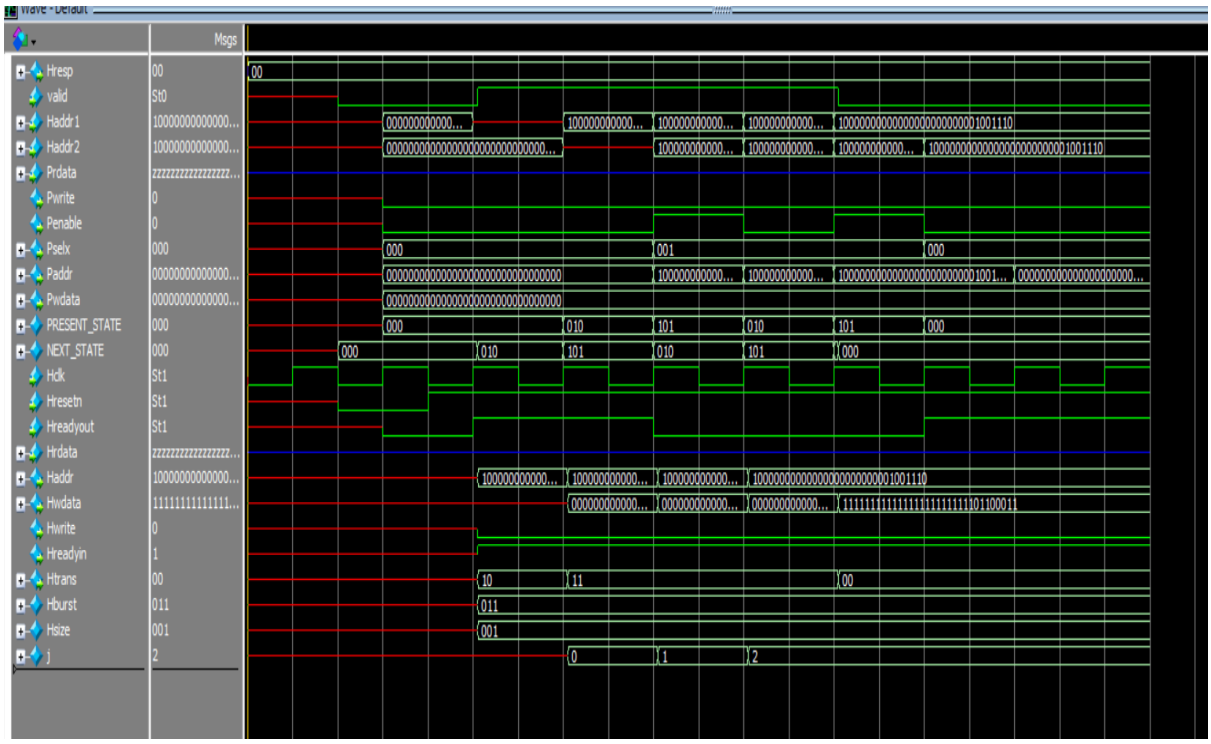
2.SINGLE_READ_TRANSFER



3.**BURST_WRITE_TRANSFER**

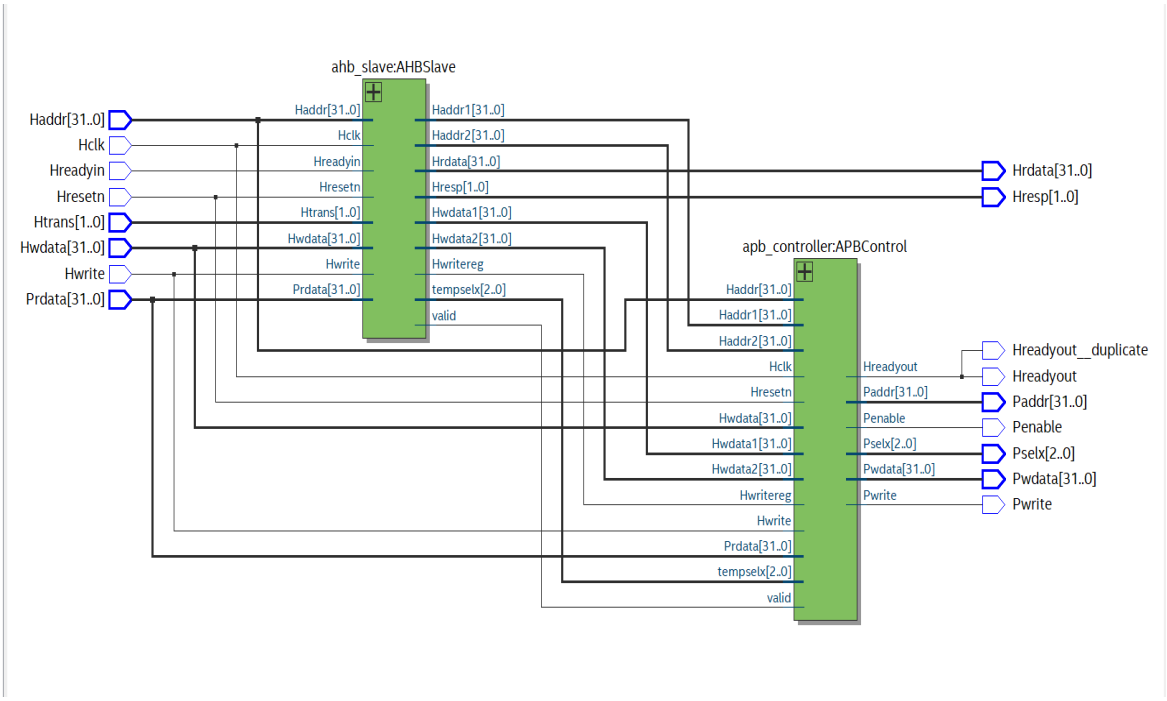


4. **BURST_READ_TRANSFER**

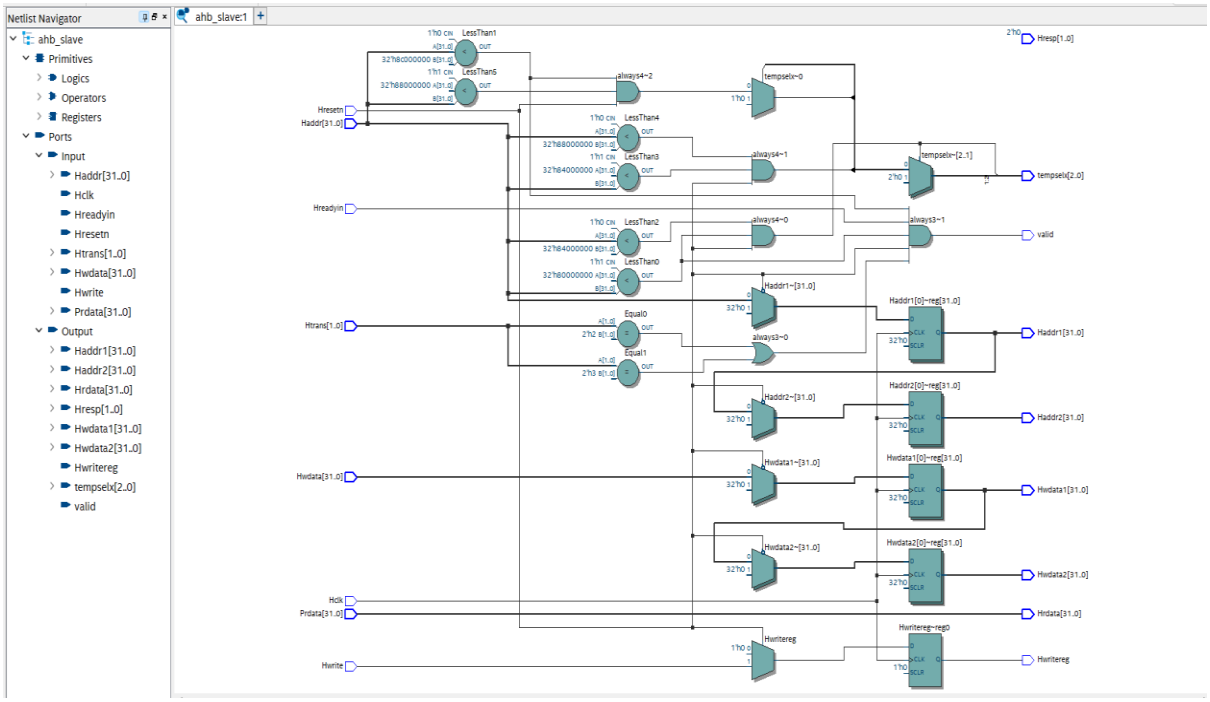


SYNTHESIS :

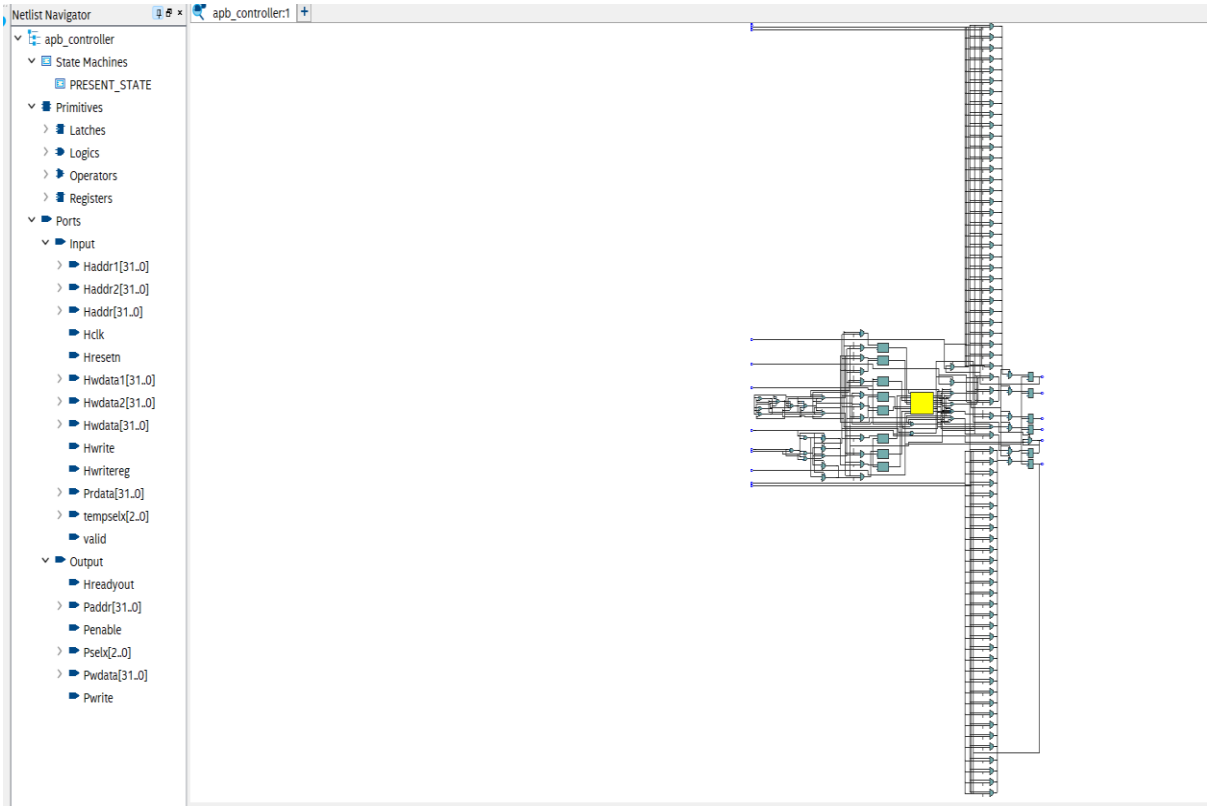
1. BRIDGE_TOP_MODULE



2.AHB_SLAVE_INTERFACE



3.**APB_FSM_CONTROLLER**



CONCLUSION :

- I learnt very new topic AMBA microcontroller from this project . I knew only about 8085 and 8086 microprocessors . But this project introduced me a new microprocessor which will be used in VLSI domain.
- As this is my first VLSI Design Internship , it helped me to understand the depth of VLSI . I Learnt the basics and future of VLSI . It will be helpful to increase my knowledge in VLSI in the right path .
- From this project , I learnt the software tools like ModelSim , Quartus prime for several circuits and designs as of my own . I learnt each and every way to simulate , synthesize the circuits . I have faced so many difficulties in installing and using the tools , but with practice and the videos of user guide and installation guide helped me so much in a easy way .
- This project helped me to improve my proficiency in Verilog coding .It leads to create several modules using Verilog coding in my own .Through this project only , I learnt the Verilog and its different modules and different topics in VLSI .
- The problems faced in design of top level module given me the new ways of coding skills which will make my coding skills better and helped me to crack any7 difficulty problems . The new ways make my coding very productive .

- I had a goal as a VLSI Design Engineer . This internship increased my keen of interest in VLSI domain more . This internship taught me the theoretical and practical knowledge about VLSI . It will be very helpful to me to succeed as a Design Engineer in my future .
- Through this project , my problem – solving skills has increased to solve the problems in future .