



EE652 I.C. Design Lab

Design and Implementation of AHB Protocol

**Guide: Prof. Joycee Mekie,
TAs : Mr. Kailash Prasad
Mr. Alok Pradhan**

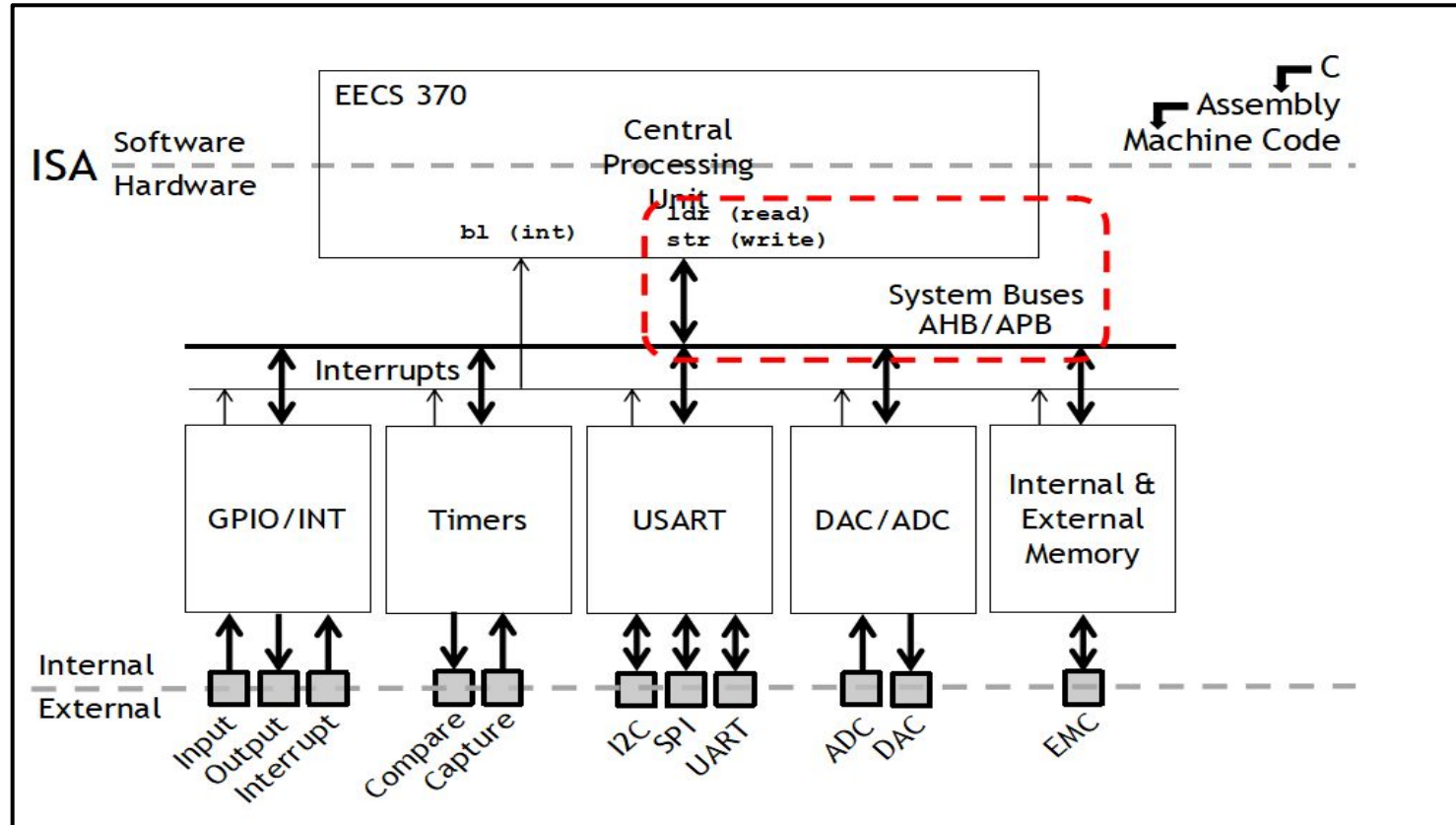
**Presented By :
Ambika Lakhera (M.Tech Electrical Engineering),
Earandi Saineeth (B.Tech Electrical Engineering)
IIT Gandhinagar**

10th April, 2023

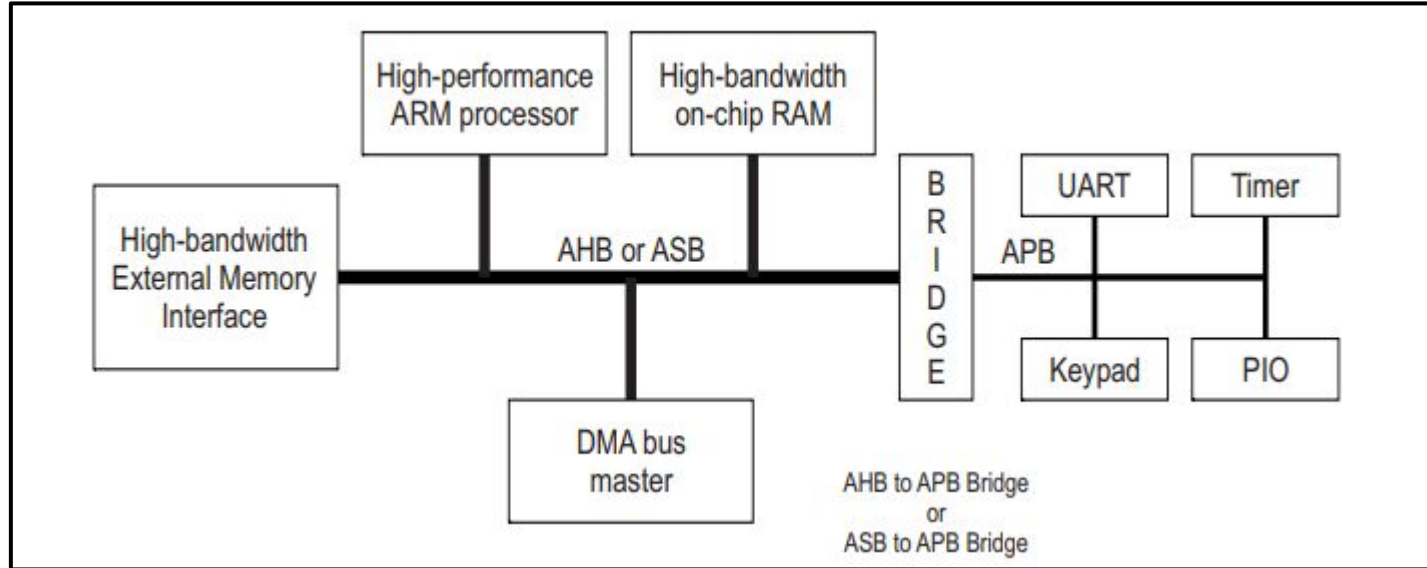
Outline

- Introduction
- Implemented System
- Basic Signals and Functionalities
- Different Components/Modules and their Testing
- Top Most System
- References

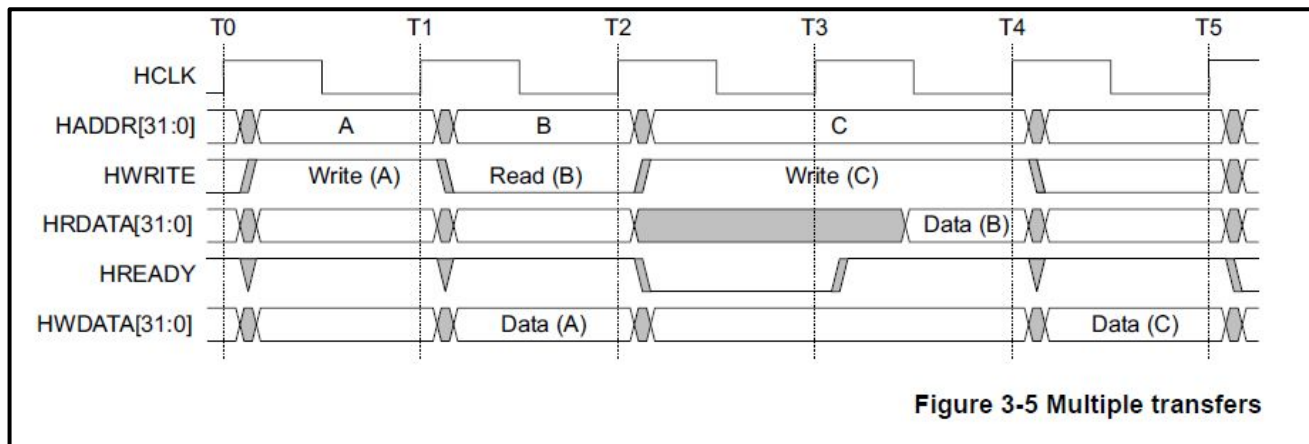
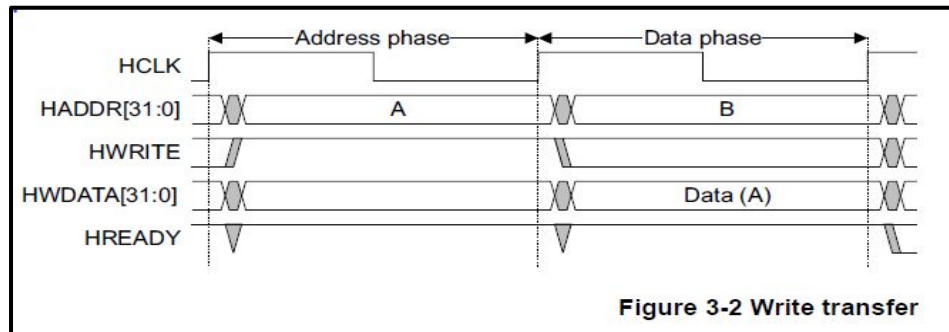
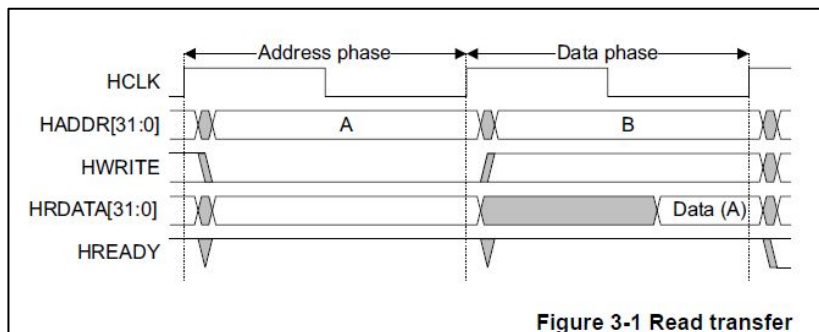
Busses: the glue that connects the pieces



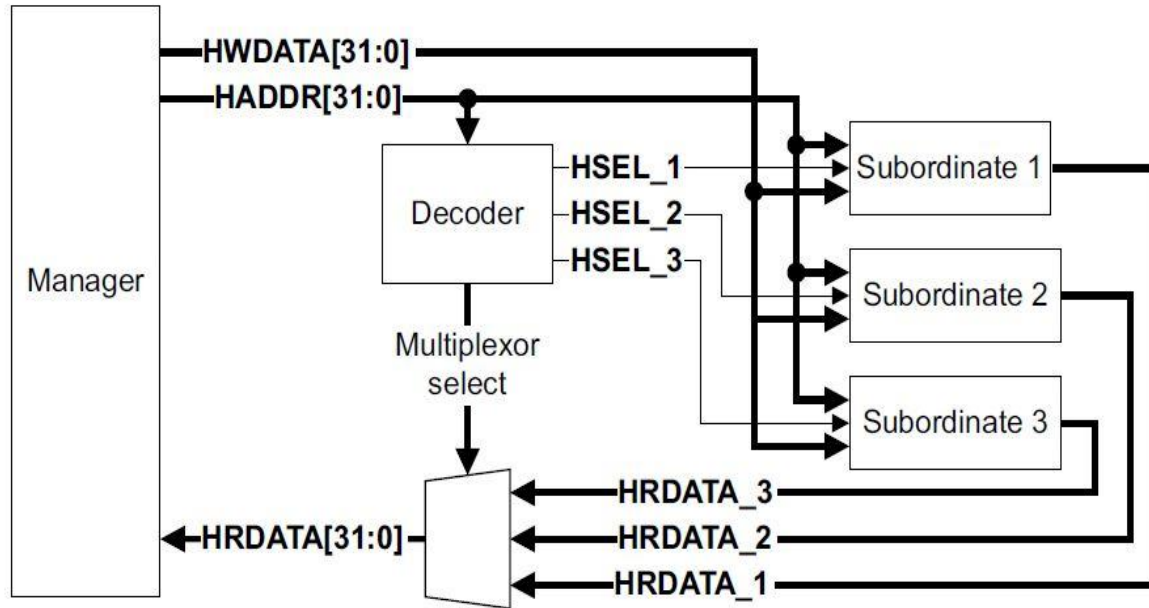
Introduction



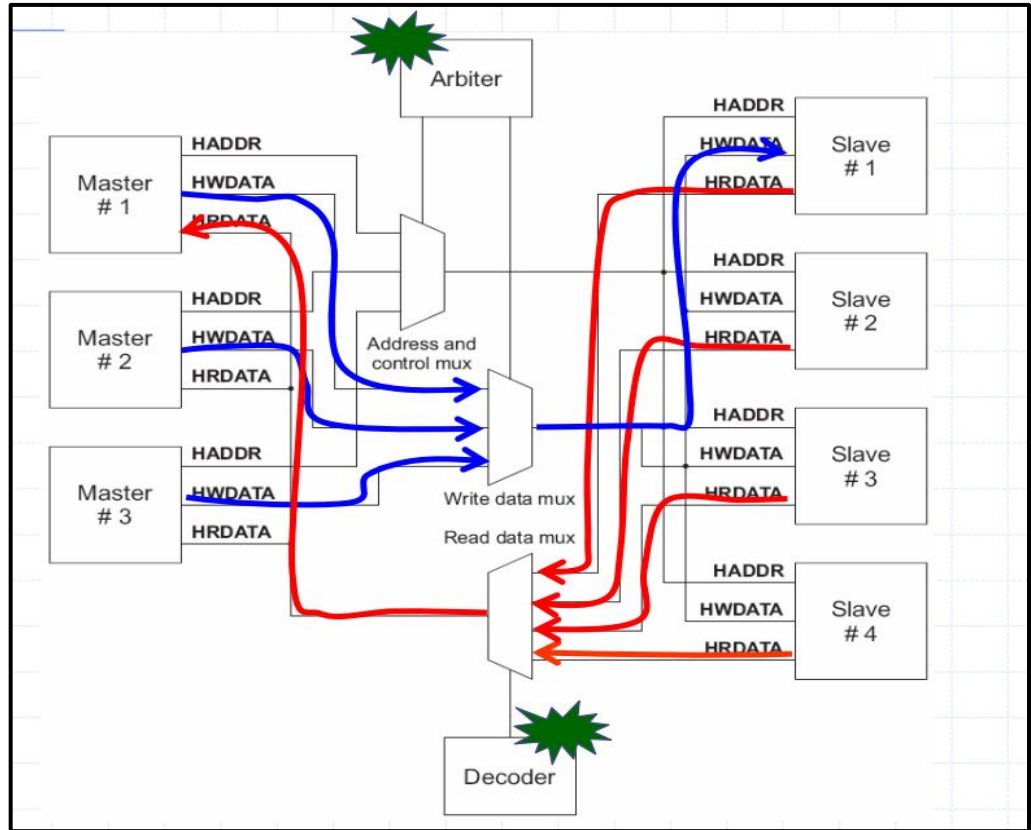
Basic Transfers



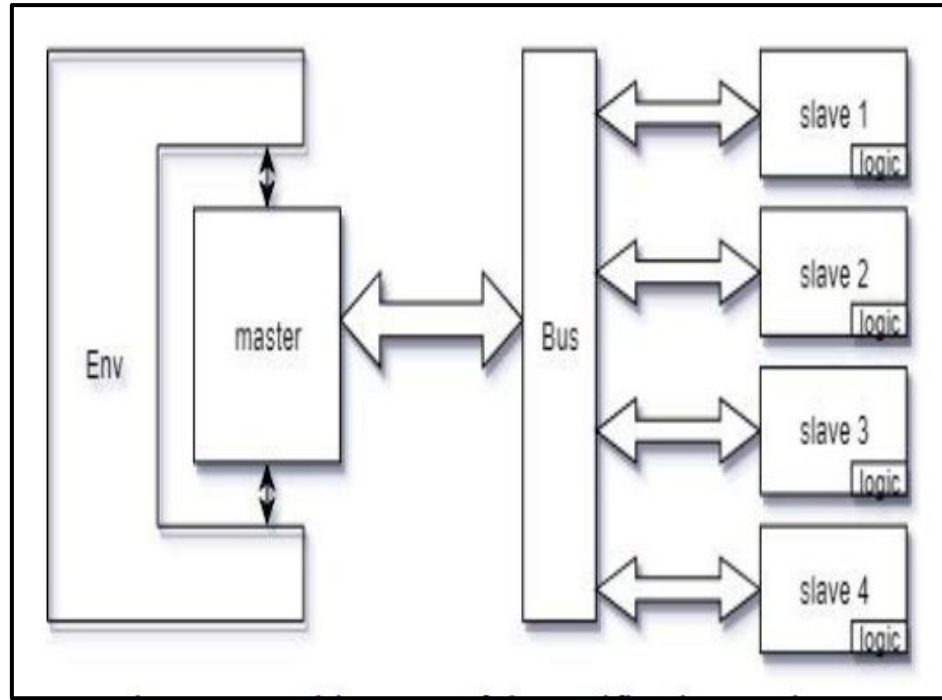
AHB Protocol



Bus Interconnection



Implemented System

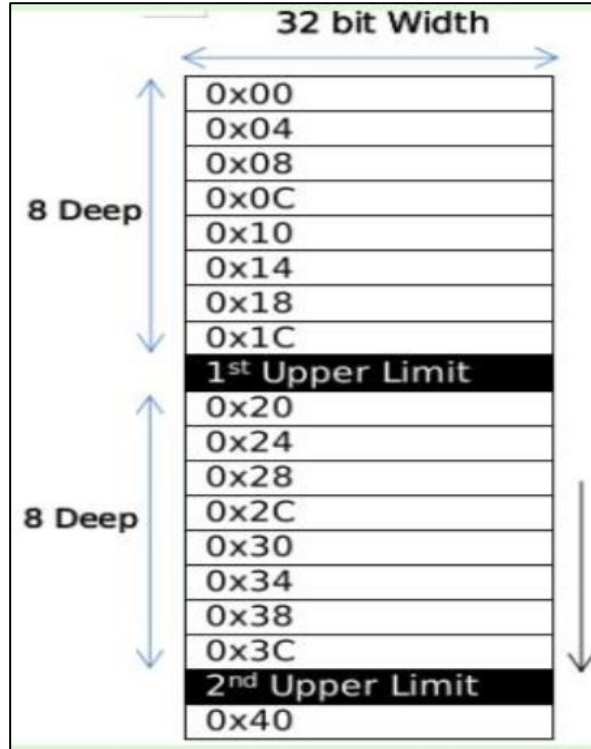


Basic Signals

Name	Source	Width
HCLK	Clock source	1
HRESETn	Reset controller	1

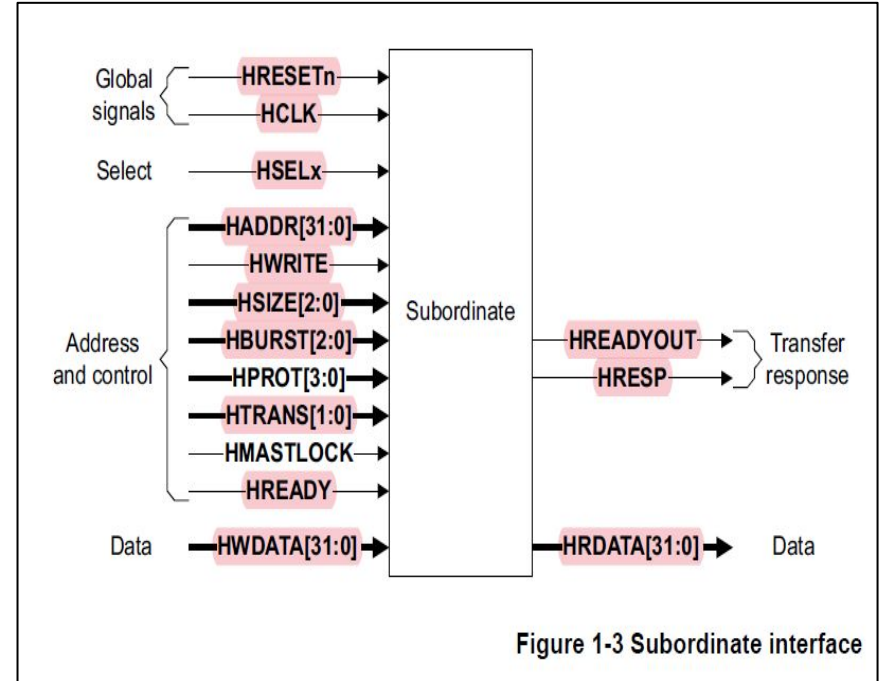
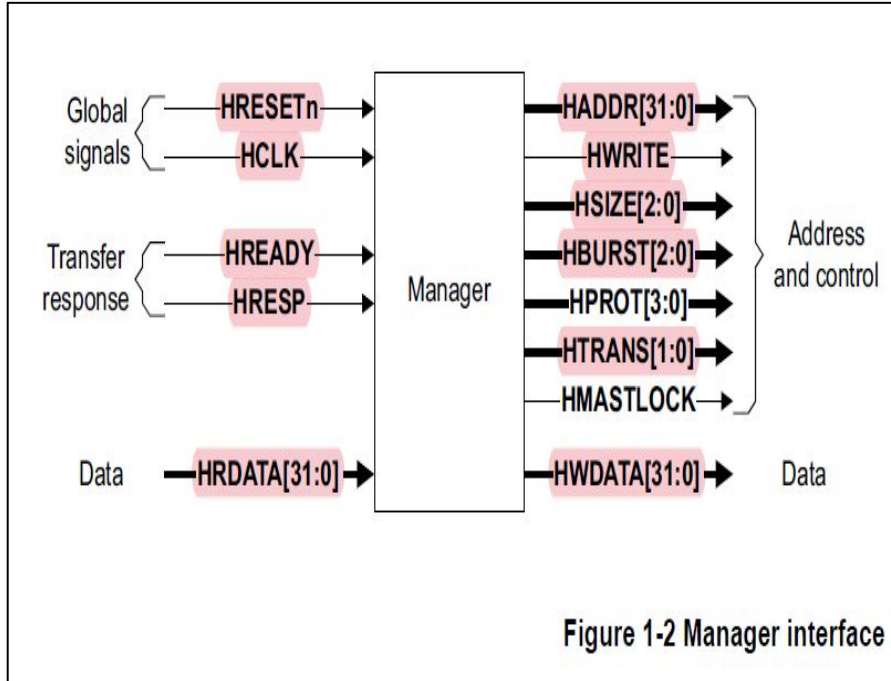
HTRANS[1:0]	Type
0b00	IDLE
0b01	BUSY
0b10	NONSEQ
0b11	SEQ

Basic Signals

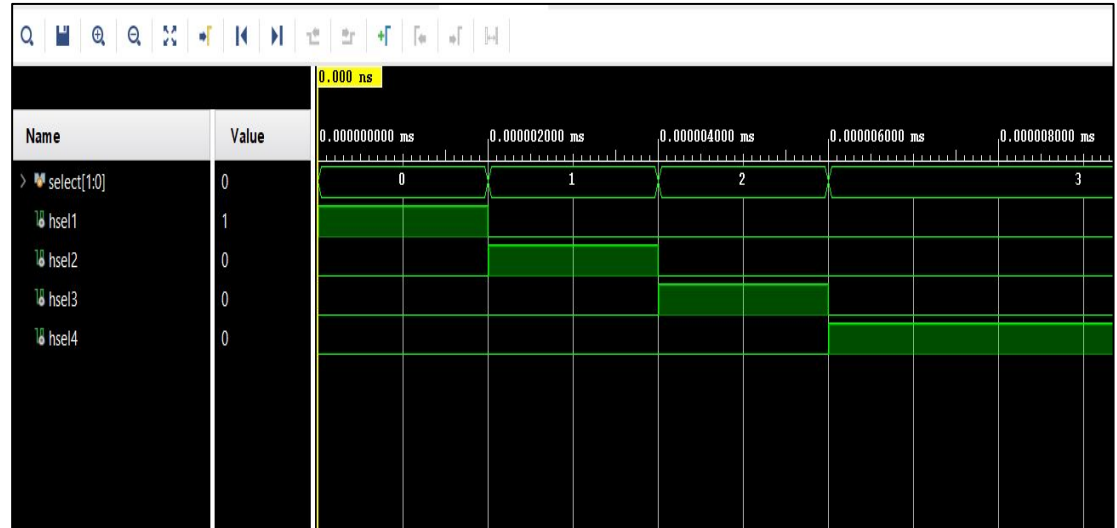
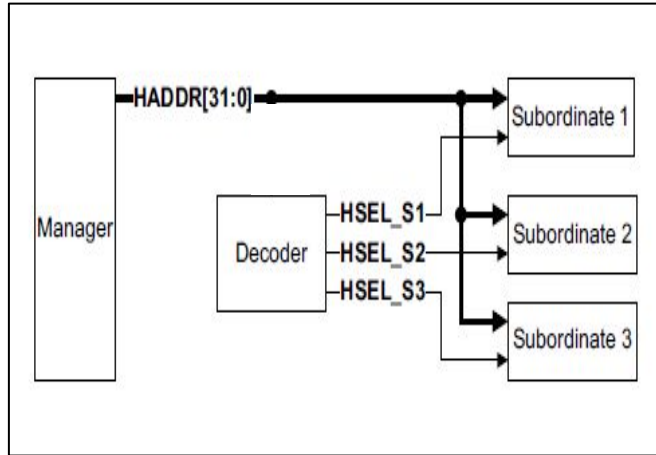


HBURST[2:0]	Type	Description
0b000	SINGLE	Single transfer burst
0b001	INCR	Incrementing burst of undefined length
0b010	WRAP4	4-beat wrapping burst
0b011	INCR4	4-beat incrementing burst
0b100	WRAP8	8-beat wrapping burst
0b101	INCR8	8-beat incrementing burst
0b110	WRAP16	16-beat wrapping burst
0b111	INCR16	16-beat incrementing burst

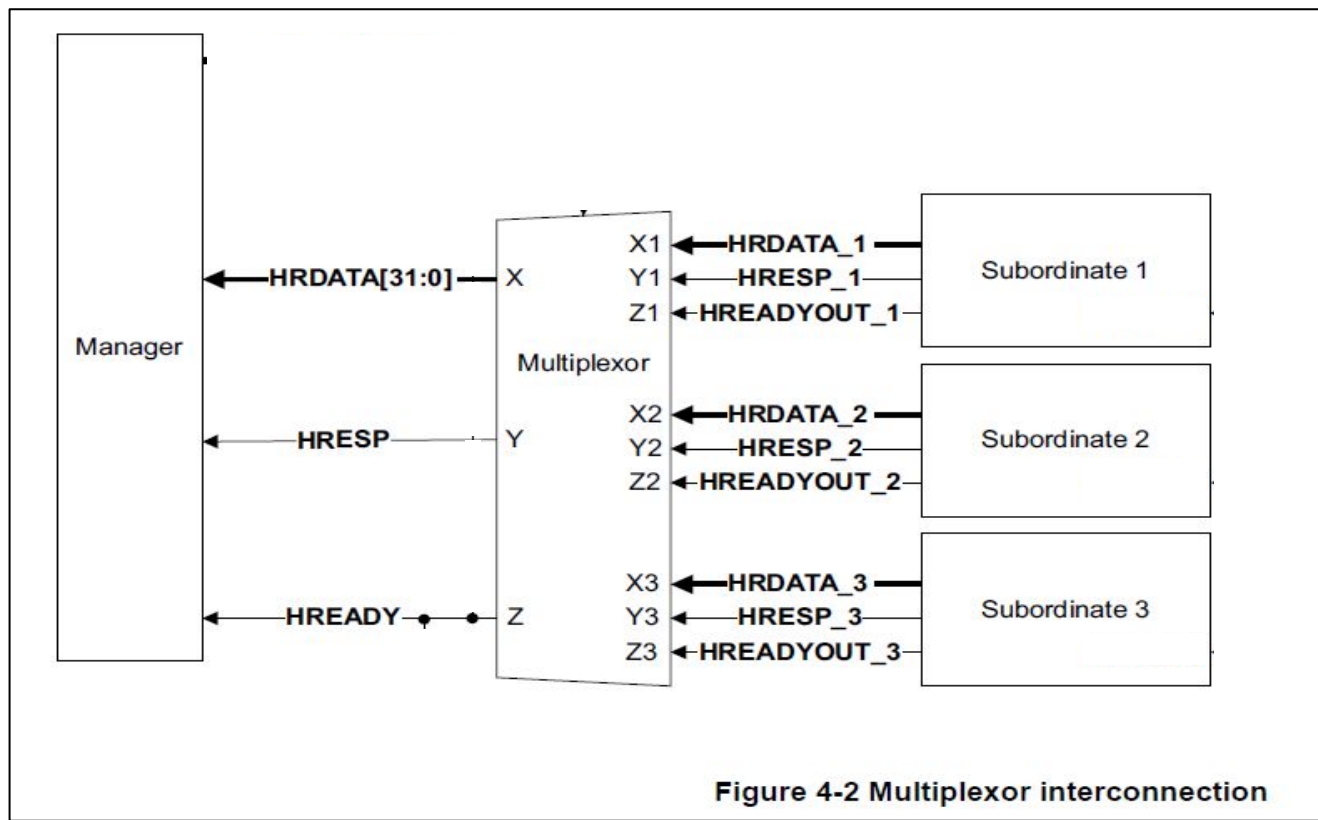
Master and Slave used in the Work



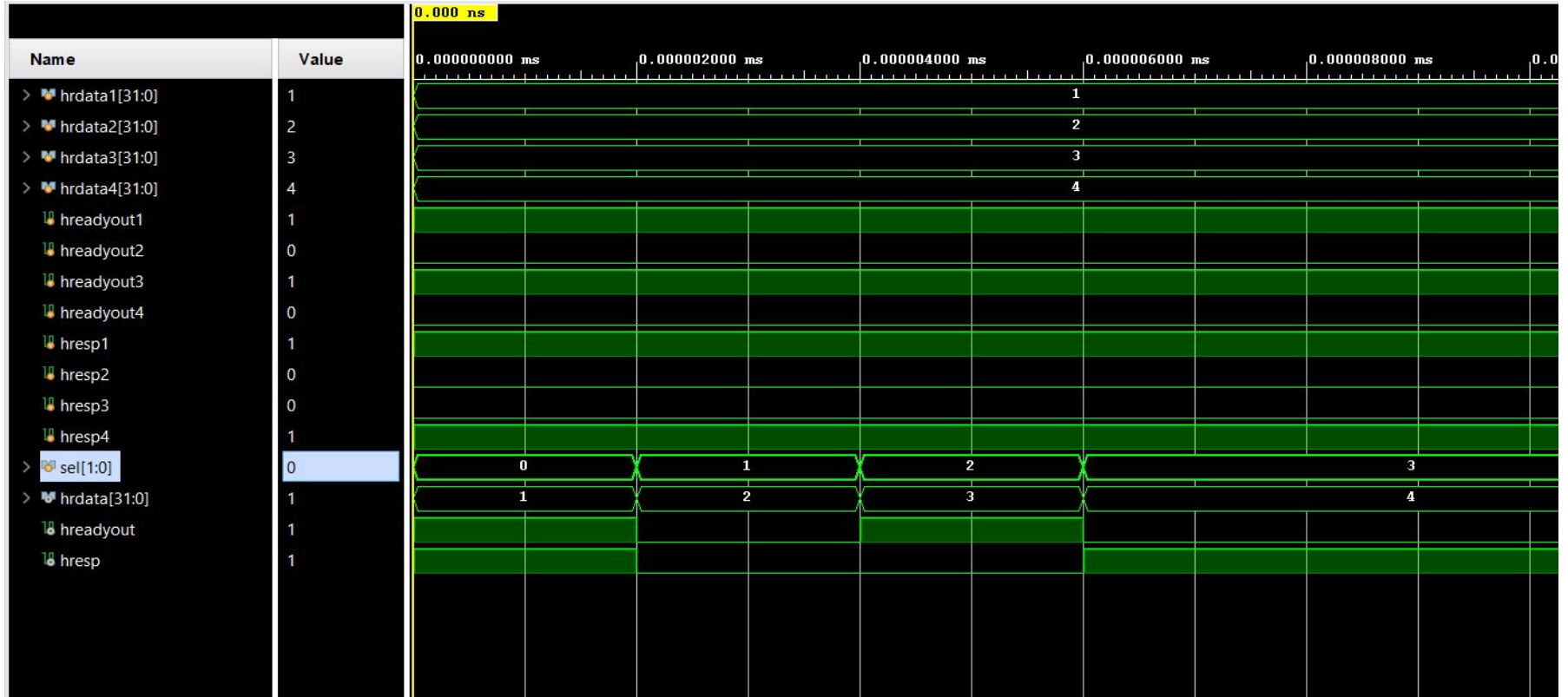
Decoder



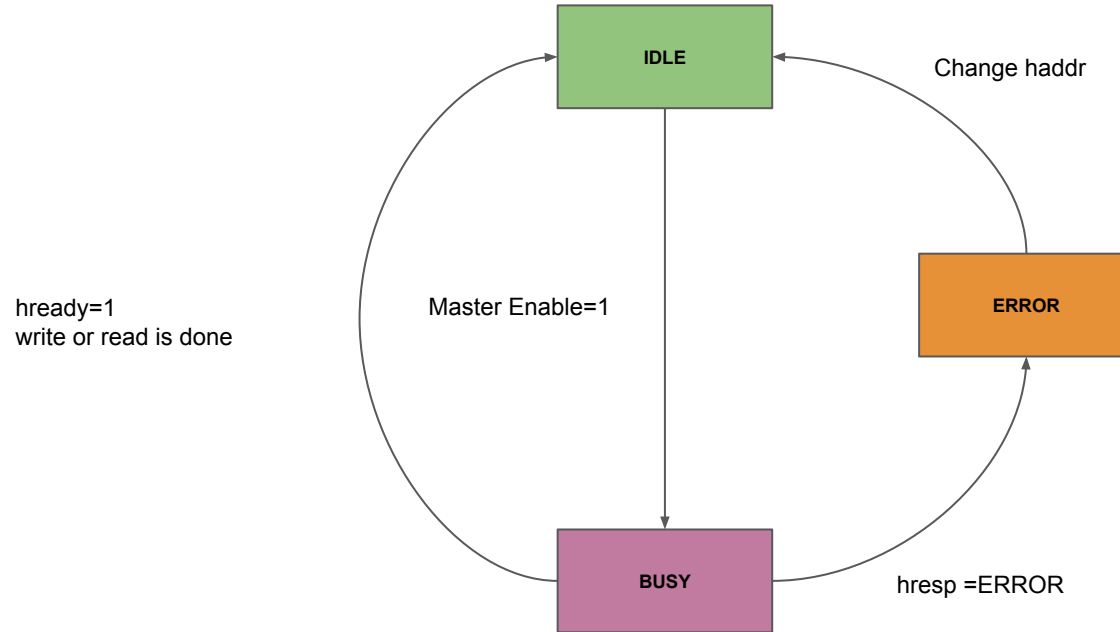
Multiplexor



Multiplexor (Contd.)



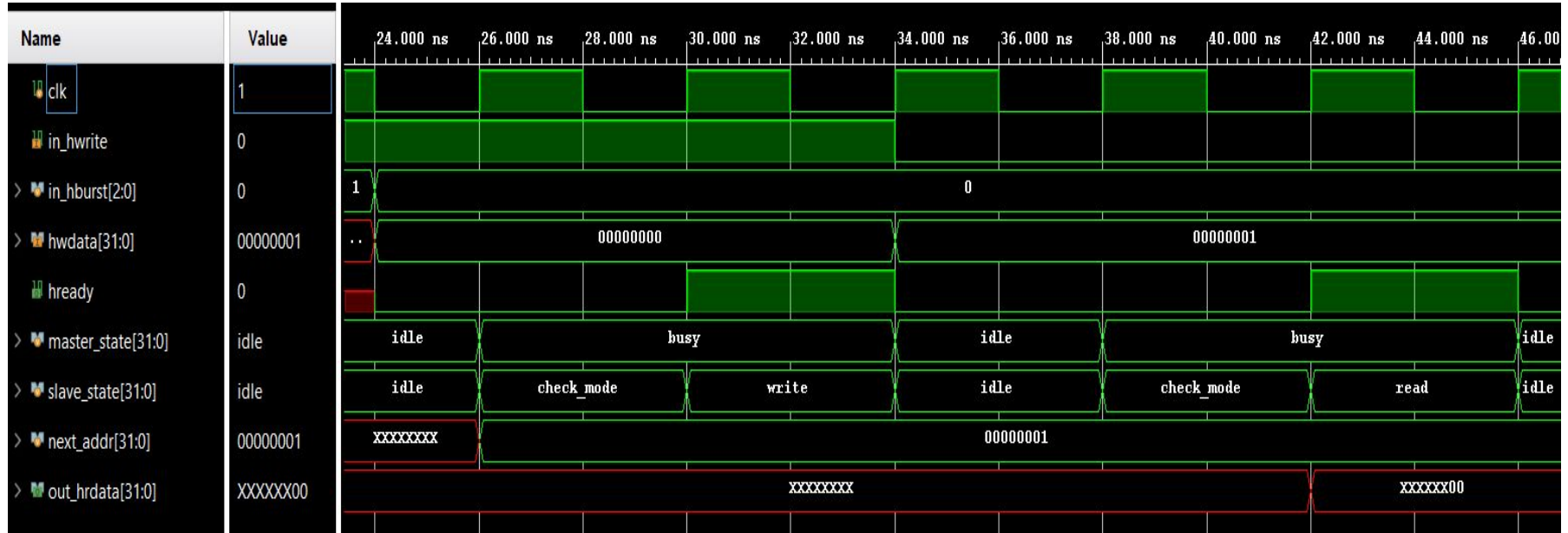
Master State Model



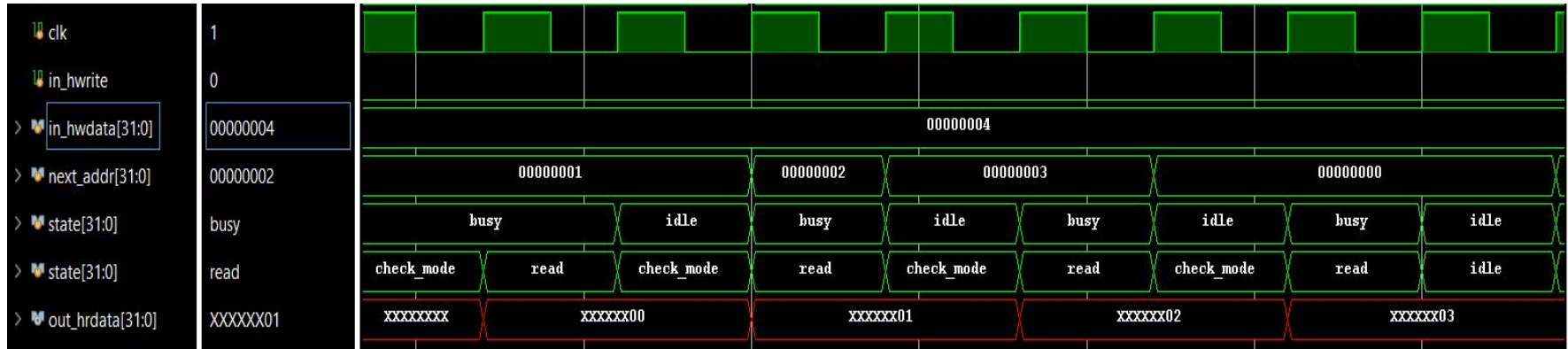
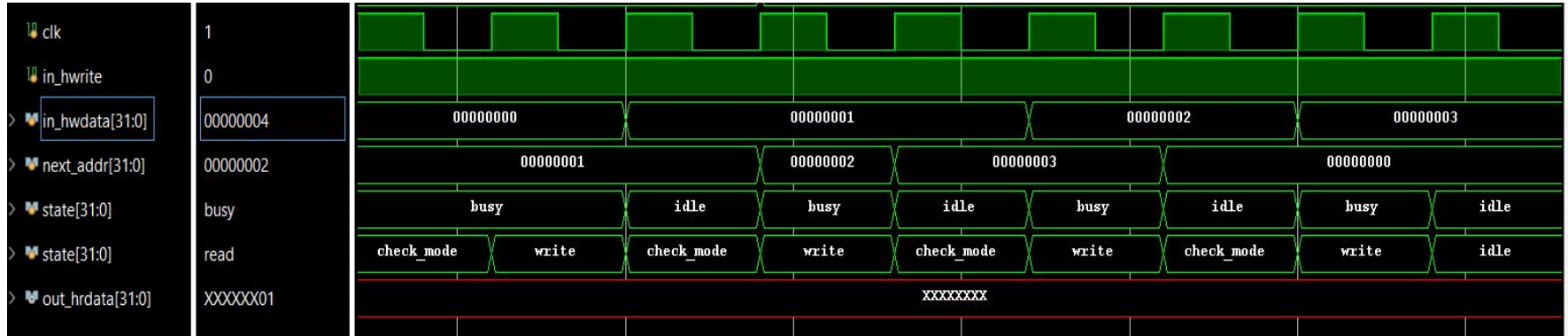
Slave State Model



Result 1: Single transaction write and read



Result 2: 4 beat wrap



Result 3: 4 beat increment write and read



Result 4: Unspecified increment write and read



References

- [1] AMBA Specification (Rev 2.0), <https://developer.arm.com/documentation/ih0011/a/>
- [2] IHI033C AMBA AHB Protocol Specification, <https://developer.arm.com/documentation/ih0033/a/>
- [3] http://mapl.nctu.edu.tw/course/ESL_2008/files/Lecture10.pdf
- [4] Perumalla Giridhar, Priyanka Choudhury, “Design and Verification of AMBA AHB”, 2019 1st International Conference on Advanced Technologies in Intelligent Control, Environment, Computing & Communication Engineering (ICATIECE)