Chip2Chip Guide

2024 Logic Design Lab

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Agenda

Concept

Implementation

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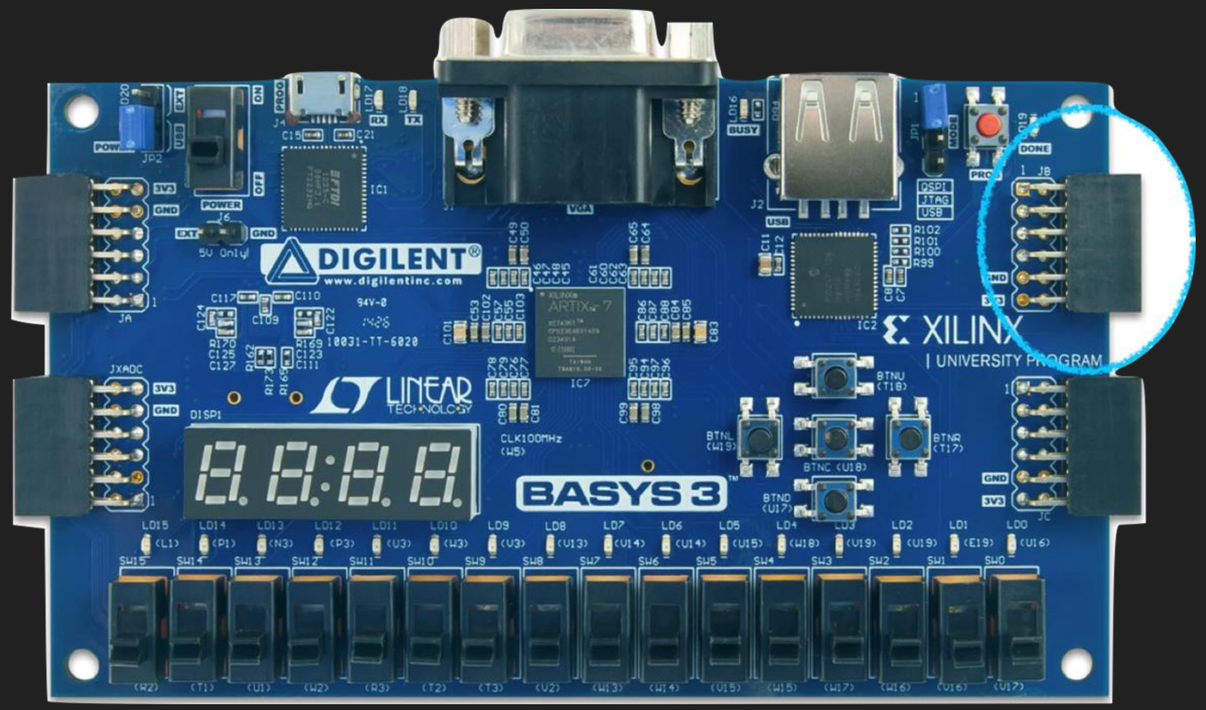
Implementation

Concept (1/7)

- We use the pmod ports on the board to send message to the other board!



Concept (2/7)

- We want to build an interface that can carry out reliable transmission!
  - Need to perform handshaking before the every transmission
  - Use stop and wait method, no need for sliding window
  - Need to make sure that a massage is received and processed!(Reliable)

Concept (3/7)

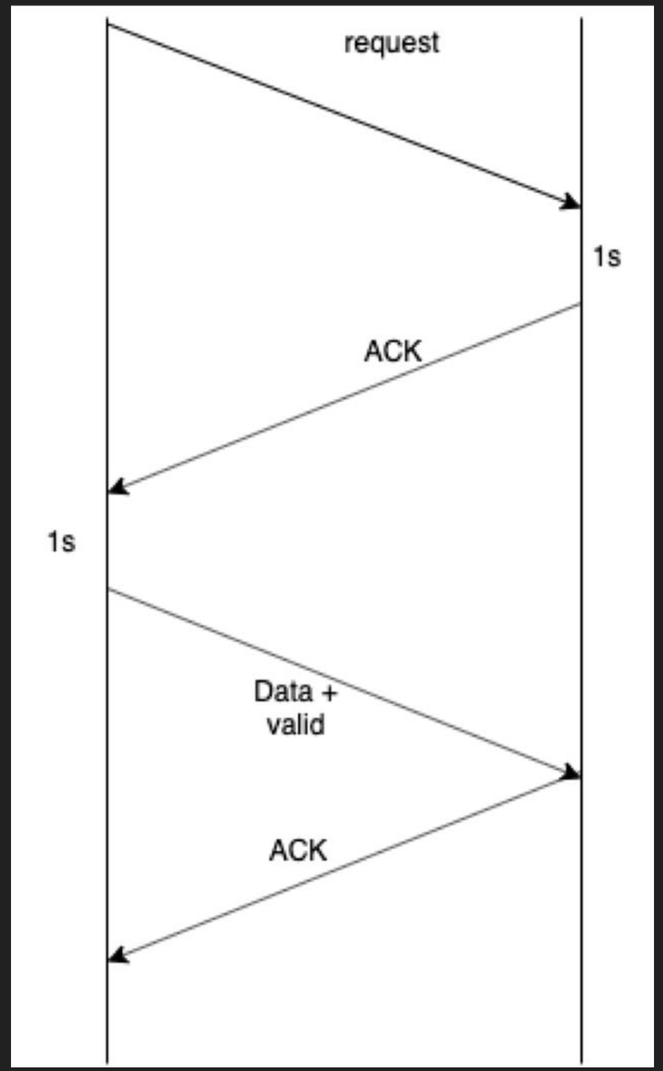
- To achieve our goal, what signals do we need?
  - Request: Master tell slave that it would like to send a massage.
  - ACK: Slave’s notification to master that the massage have been received.
  - Data: The actual data from master to slave.
  - Valid: The master indication to slave that the current data is valid

Concept (4/7)

The mechanism is pretty straight forward:

1. Master send request to the slave.
2. Slave illuminate LED for 1 second.
3. Slave send ACK to master, indicating that the request was received.
4. Master illuminate LED for 1 second.
5. Master send data to slave, asserting valid when the data is ready to be sampled.
6. Slave receive the data and send ACK again to master, letting the master know that the transmission has been completed.

Concept (5/7)

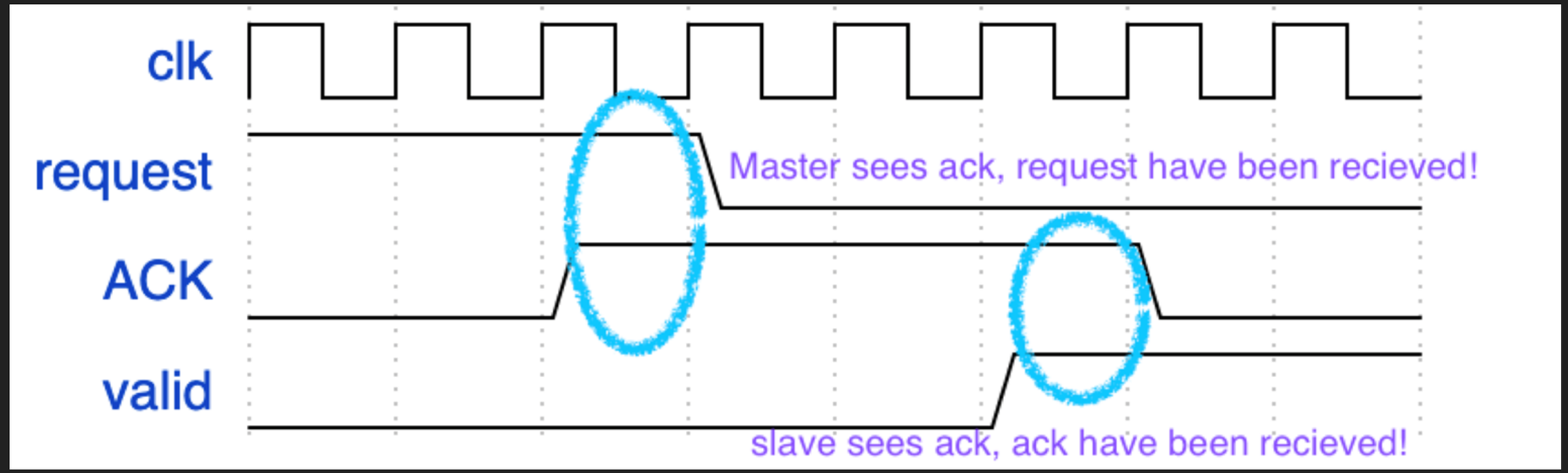


Concept (6/7)

- However, transmission via jumper cable is very unstable
  - If we only send data, request, or ACK for only one cycle, the receiver will fail to receive the message in case of an signal loss.
  - We can use **Timeout mechanism** to implement reliable transmission, but it is way too complex for two board.
  - Instead we use technique similar to 2-phase handshaking.

Concept (7/7)

- For all outgoing signals, hold the massage until the receiver returns ACK or data.
- If the ACK or preceding signal does arrive, it means data we send is loss, keep sending!!



Agenda

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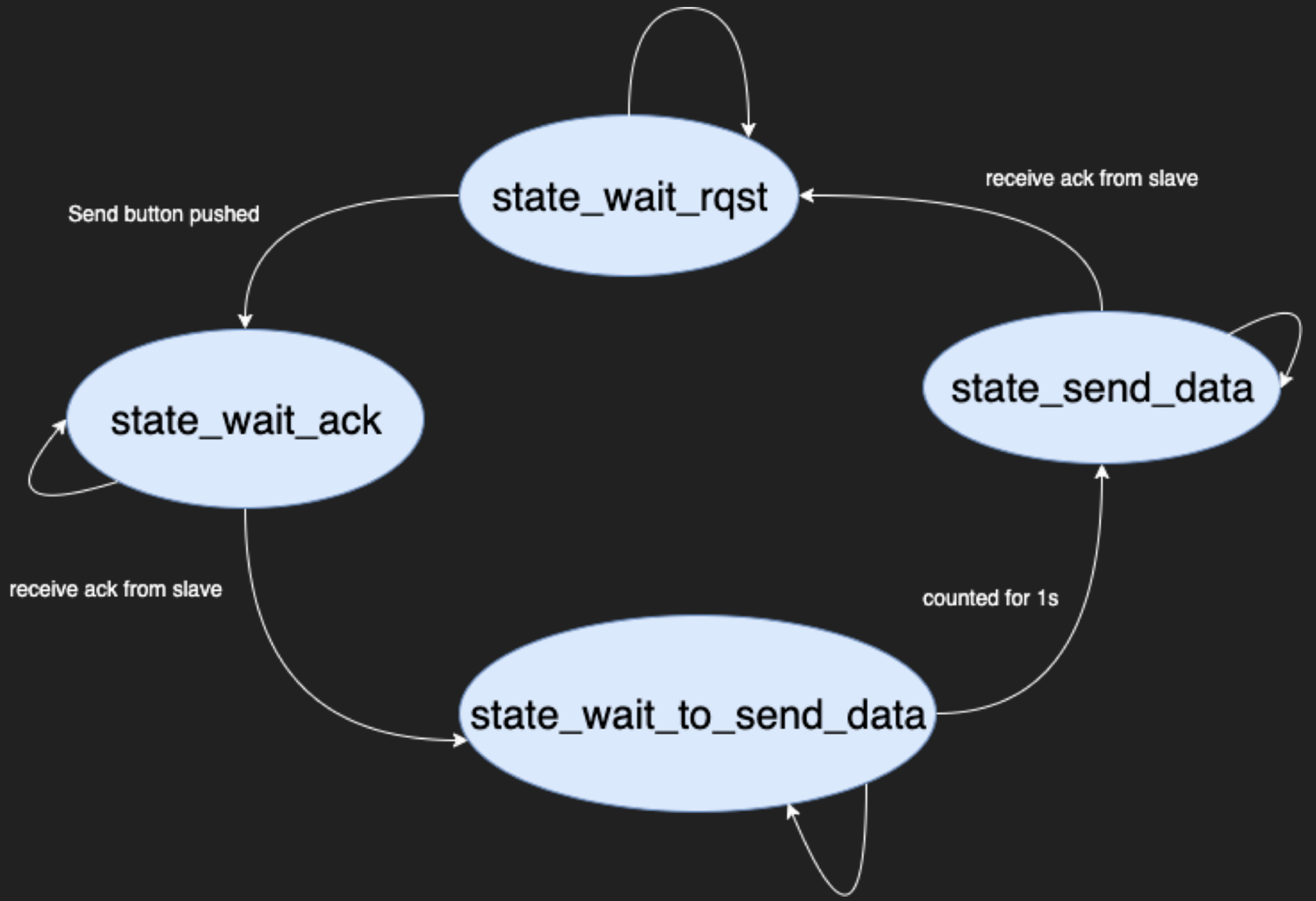
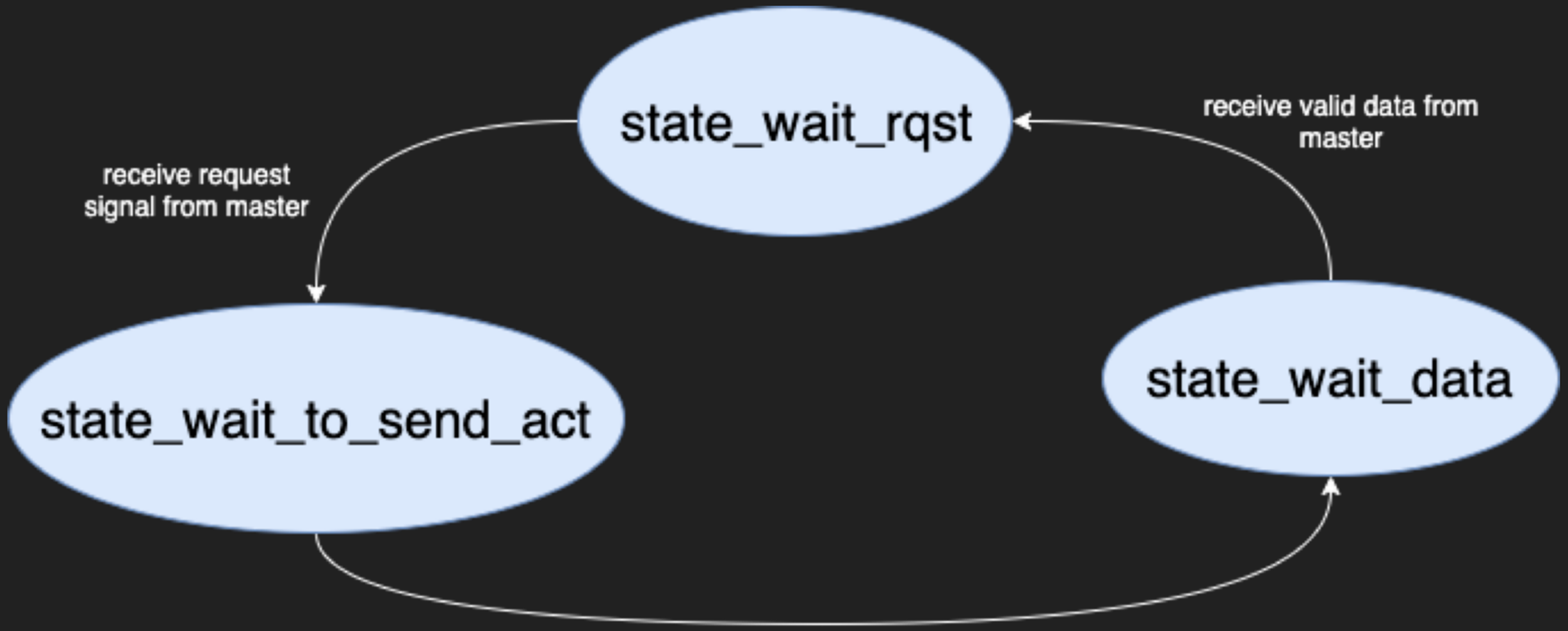
Implementation (1/2)

Master:



Implementation (2/2)

Slave:



Questions?