

18-341 Prelab Writeup Project 3

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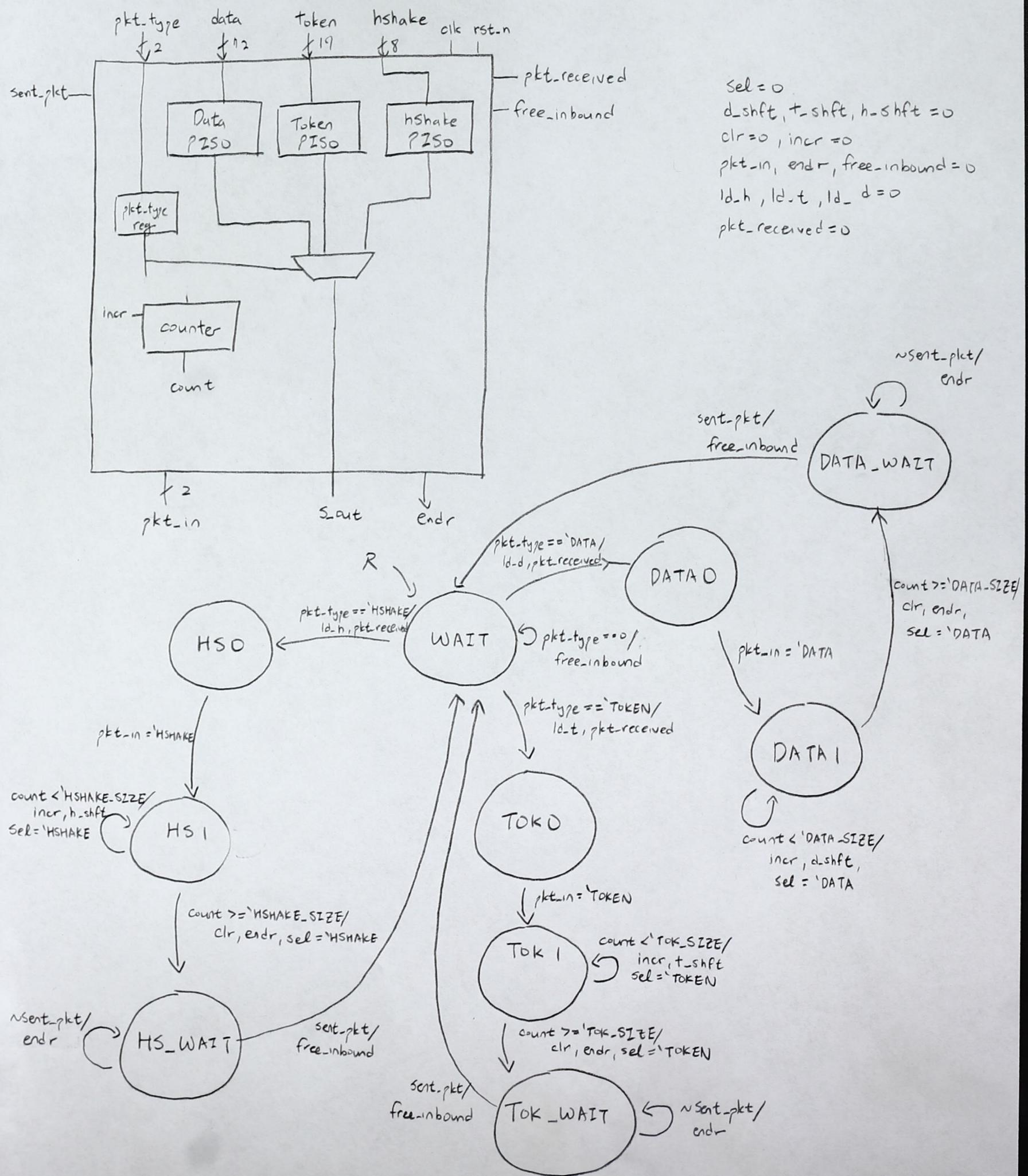
October 16, 2014

Prelab:

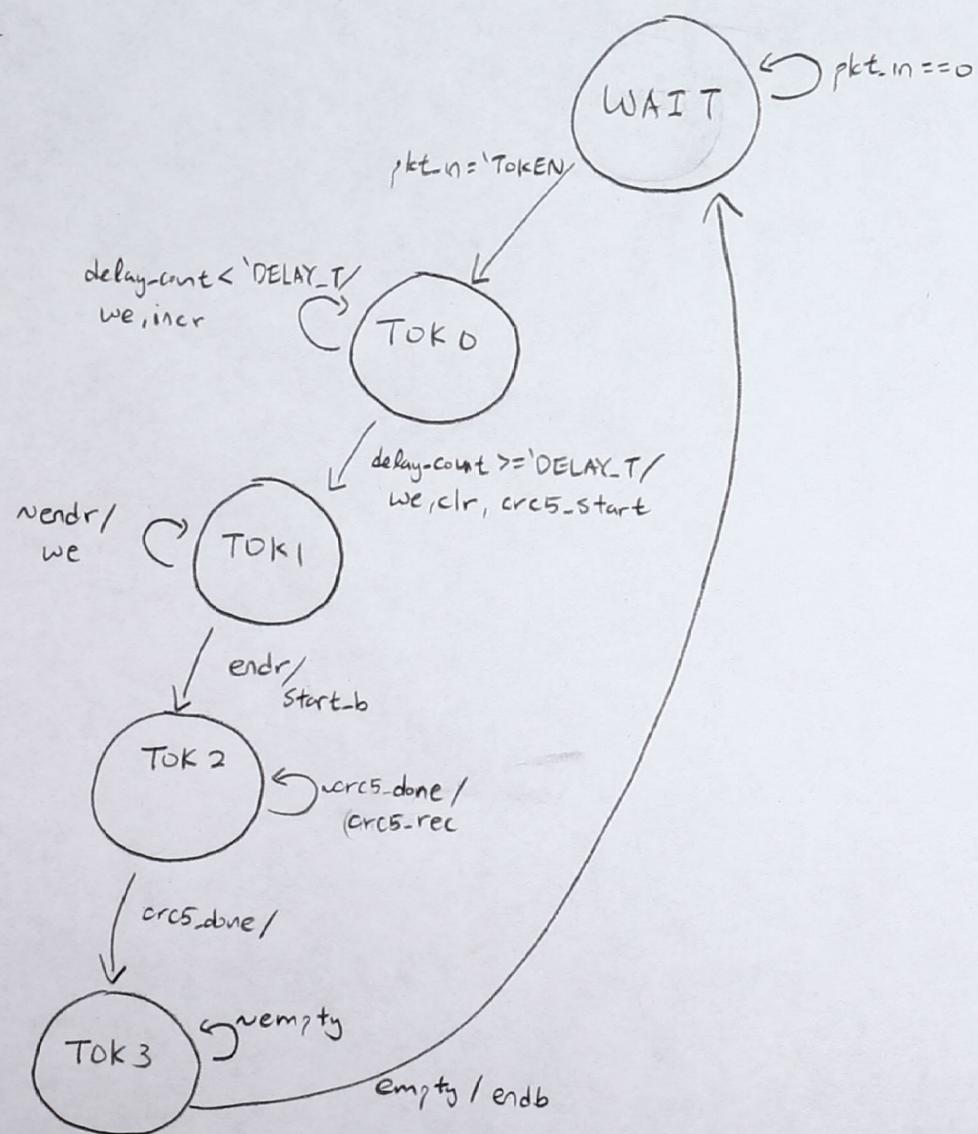
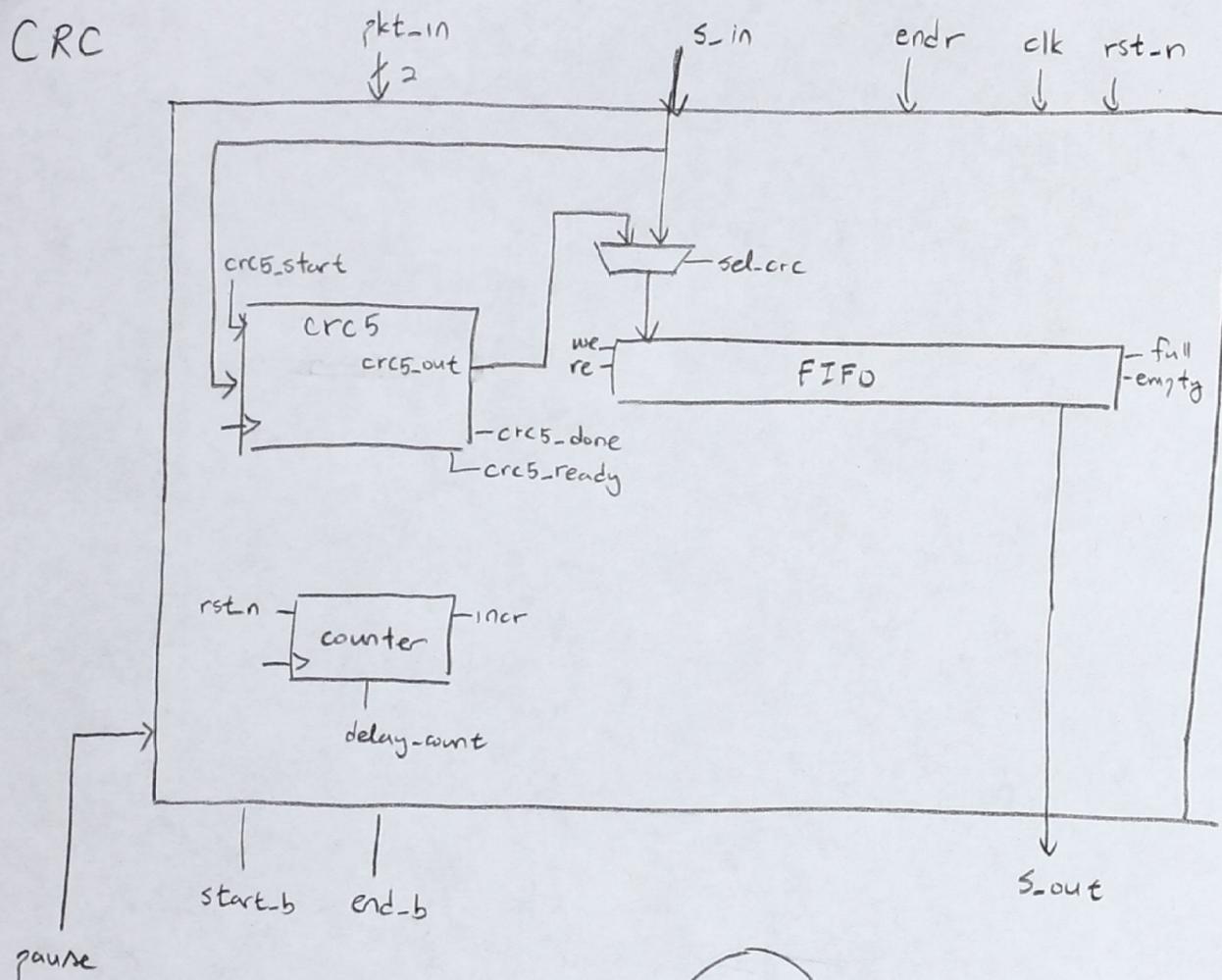
Our prelab consists of 5 modules : Bit Stream Encoder, crc, Bit Stuffer, NRZI, and DPDM.

- **Bit Stream Encoder** : This module takes data from the ProtocolFSM and stores them into a PISO. On each clock cycle, it will shift the PISO and output the data serially to crc module. There are **four handshake** signals in this module :
 - **pkt_type** : This is equivalent to put_inbound in which it sends a signal to Bit Stream Encoder saying the data is being sent.
 - **free_inbound** : After the data has been sent to the device successfully, the Bit Stream Encoder will output free_inbound to ProtocolFSM saying it's ready to take another data.
 - **pkt_received** : Once the data has been loaded to the appropriate PISO, the Bit Stream Encoder will output a signal pkt_received, saying it has received the data successfully.
 - **sent_pkt** : When the last bit has been sent out from dpdm module, dpdm module will output a signal sent_pkt to tell the Bit Stream Encoder that the data has been sent.
- **crc** : When the crc module is signaled by the Bit Stream Encoder to start(pkt_in), it first sends out a signal start_b to the Bit Stuffer and starts to receive the data serially from the Bit Stream Encoder. In the crc module, it stores the bits in a FIFO initially and sends out the data serially to the Bit Stuffer. At the same time, there is a crc5 module inside the crc module; the crc5 module takes the bits that are inputted serially and computes the remainder after the Bit Stream Encoder asserts endr which tells the crc module that every bit has been sent.
- **Bit Stuffer** : The Bit Stuffer gets a start signal from crc module. Once it gets the start signal, it sends out its own start signal to the NRZI module. The NRZI module will then send out data one bit at a time. It will do this until the it receives a signal endr_b form the Bit Stuffer. Then it will send out a signal done to NRZi.
- **NRZI** : The NRZI module waits for the signal start_nrzi from the Bit Stuffer. Once it receives the signal, it first sends out a signal start_dpdm and begins to encode the bits. After it receives the signal done, it sends out a signal we call eop to DPDM module.
- **DPDM** : Once start_dpdm signal is received, the DPDM module encodes the data and sends them out serially. Once it receives the eop signal from the NRZI module, it outputs X,X and J, and sends out a signal sent_pkt to the Bit Stream Encoder saying it has sent the packet out to the device successfully.

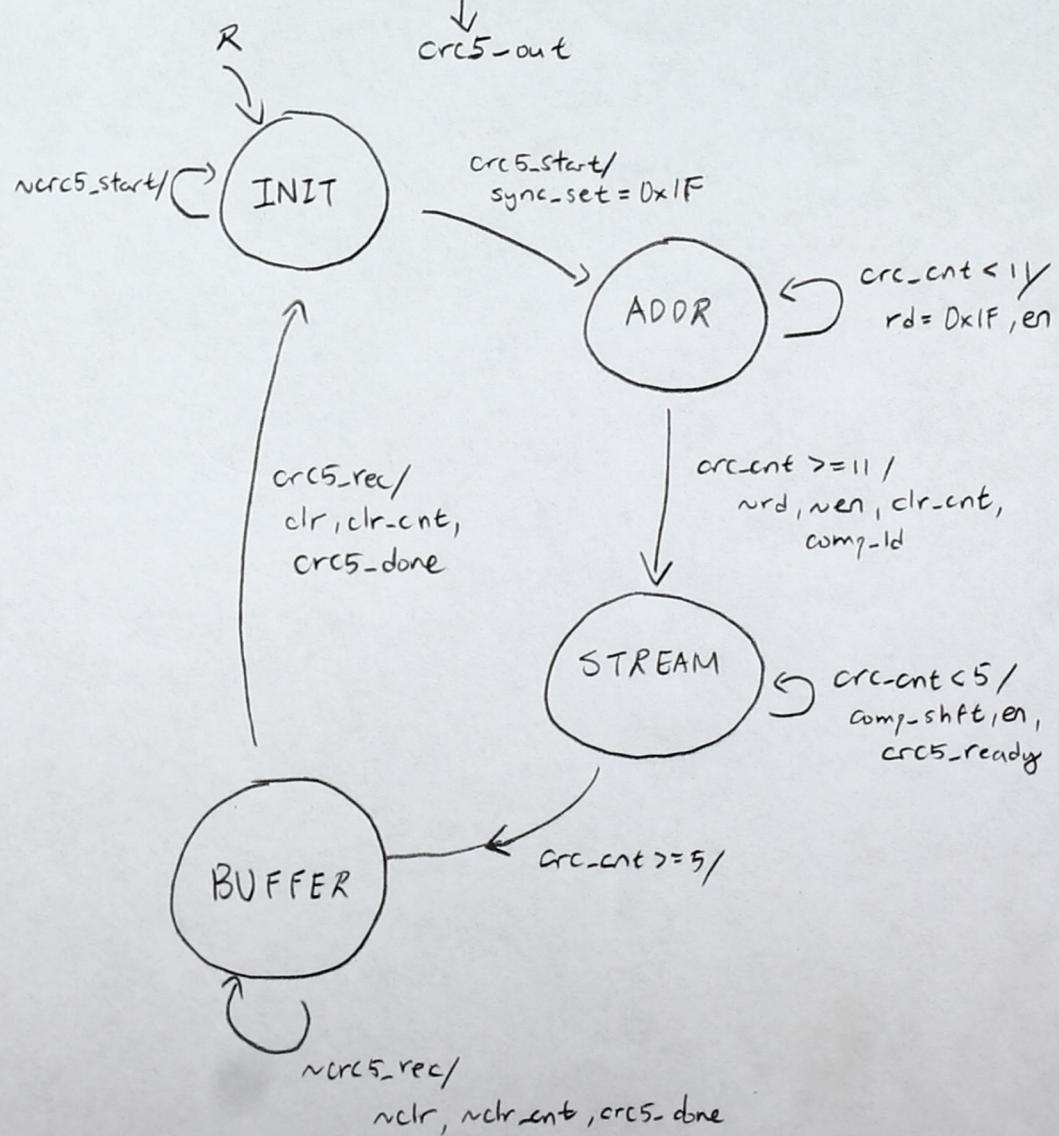
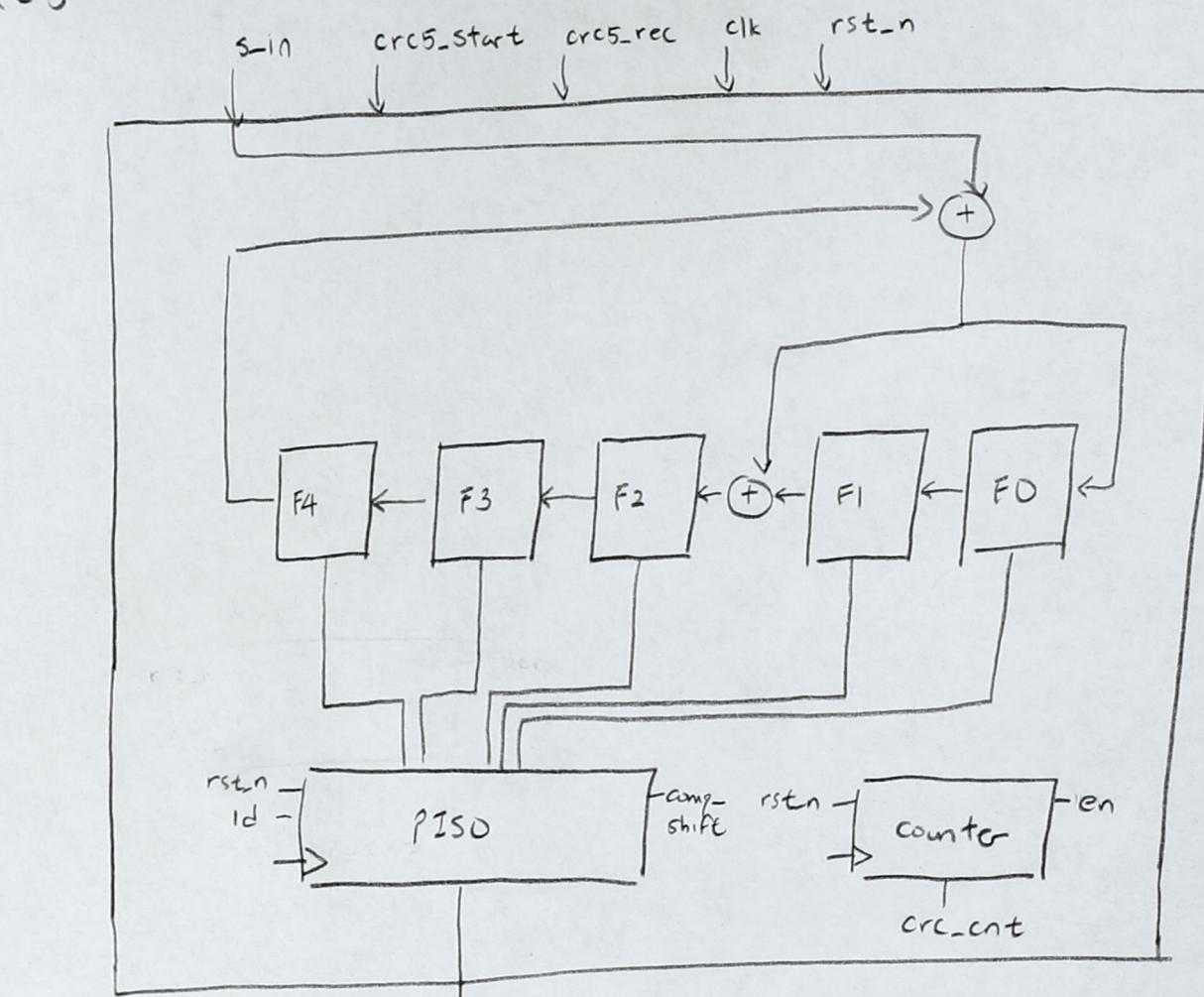
Bit Stream Encoder



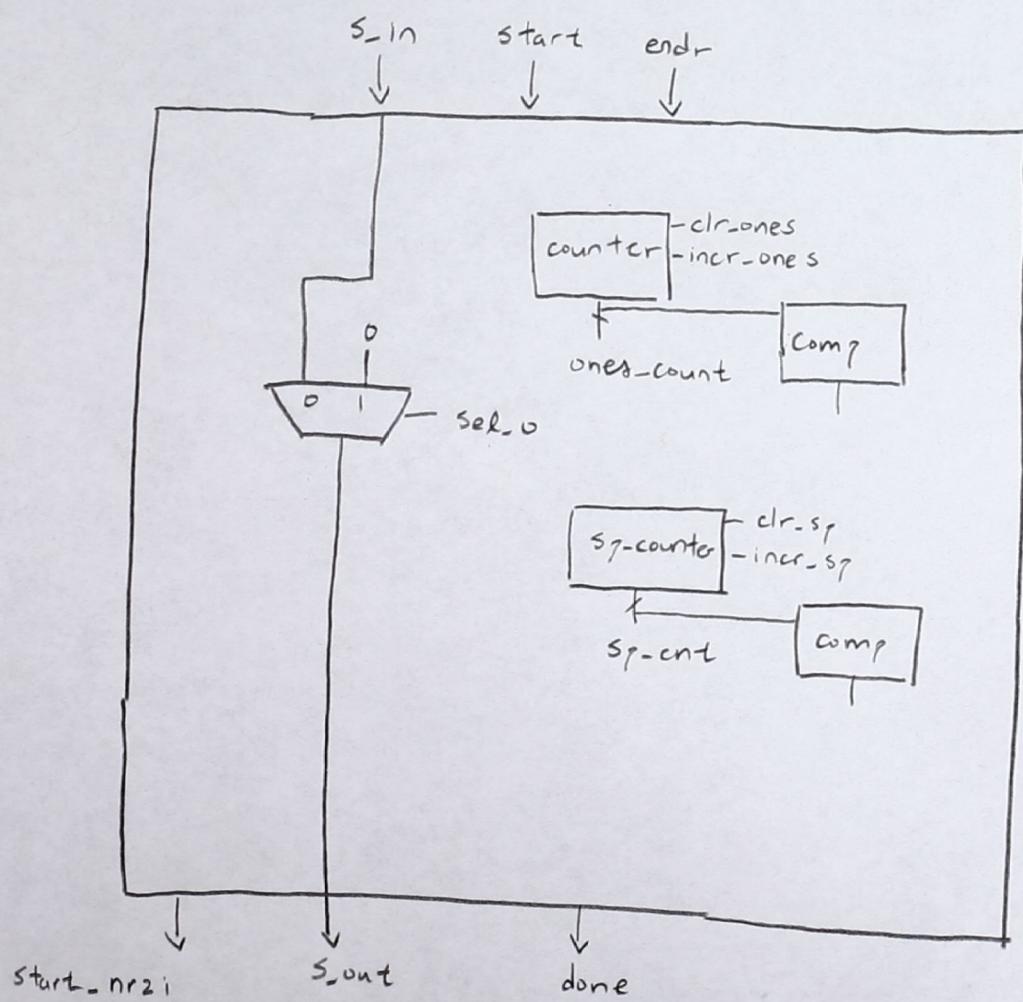
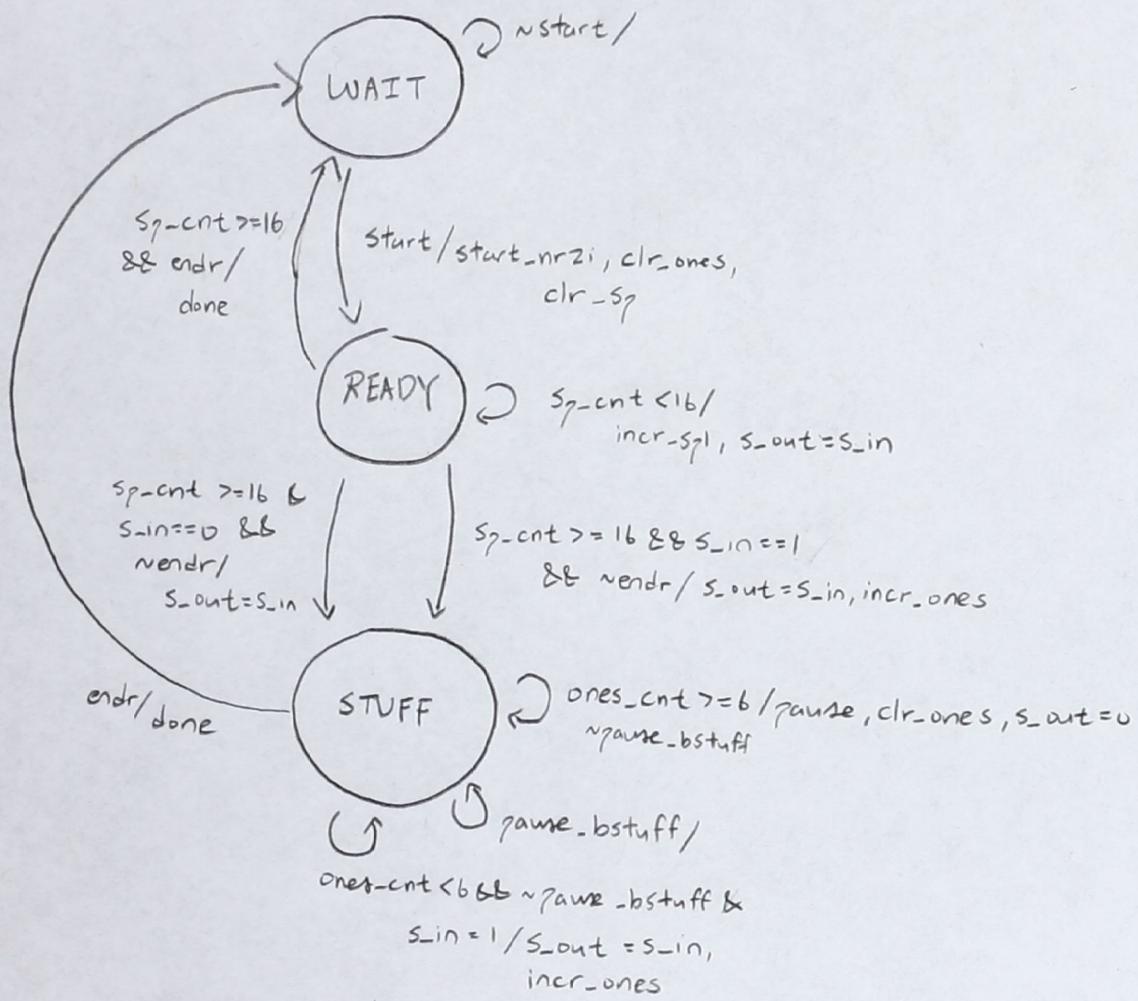
CRC



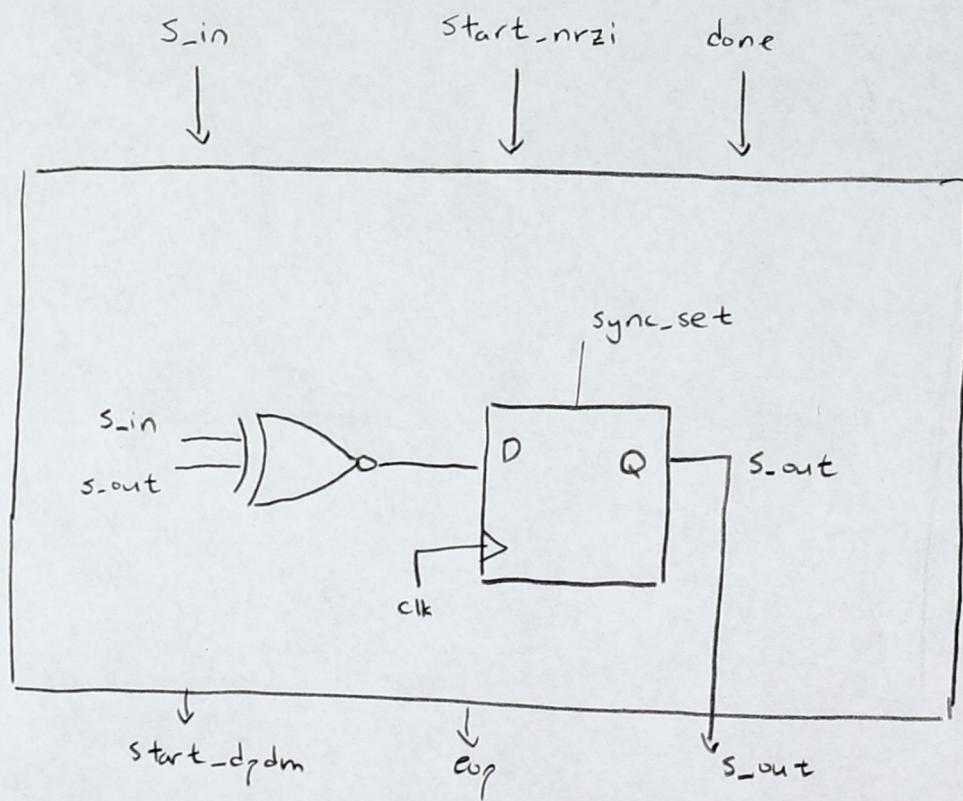
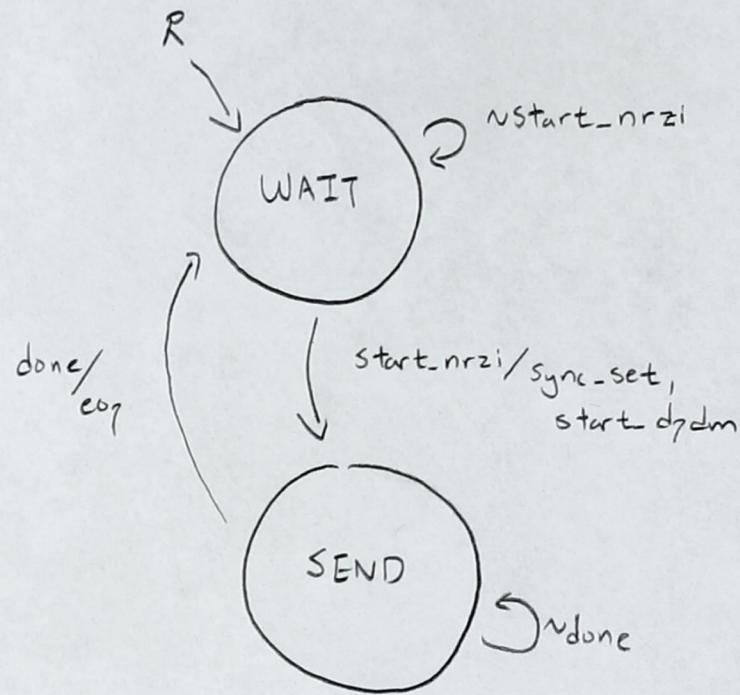
CRC5



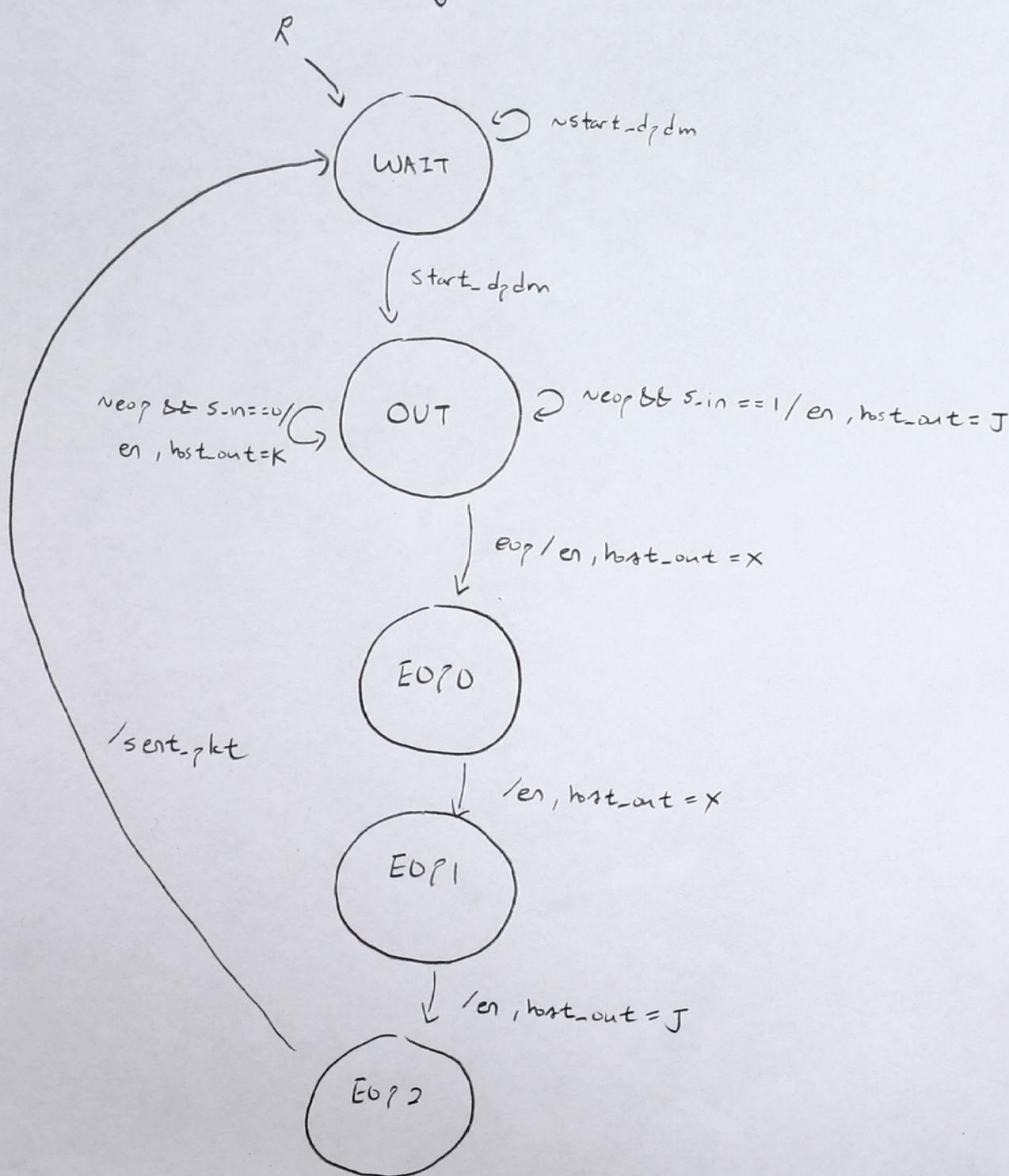
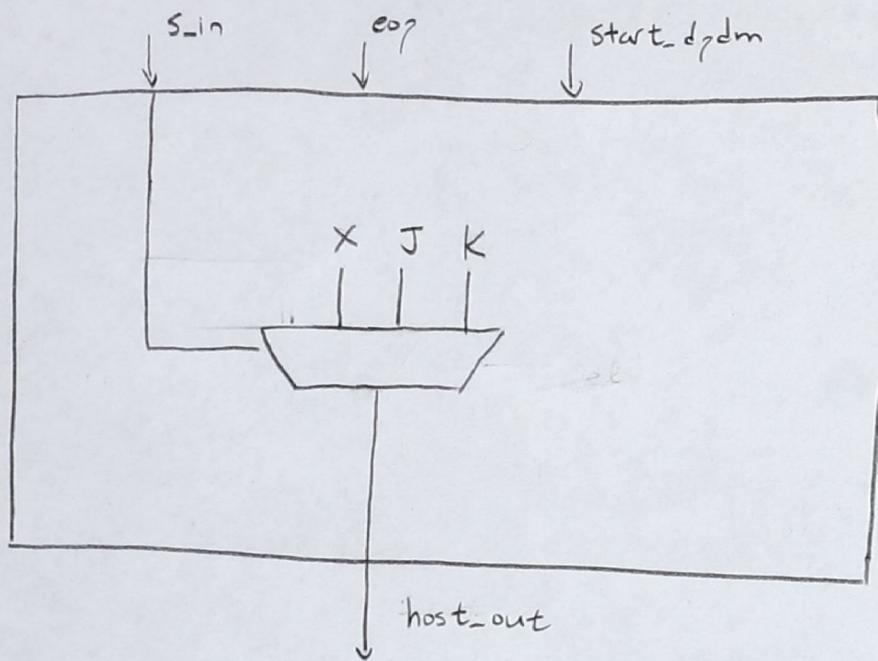
Bit Stuffer



NRZI



DPDM



PreLab

