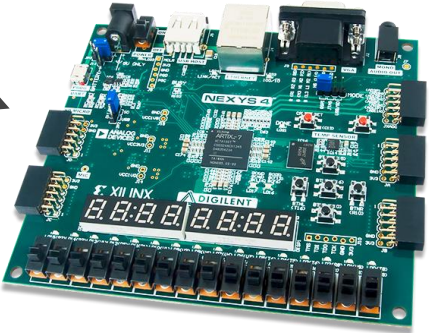
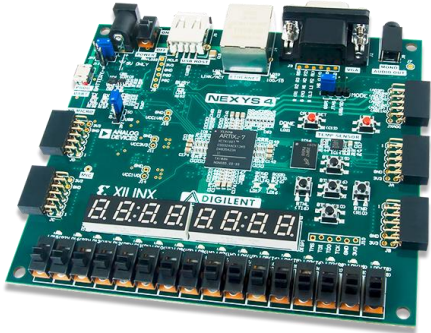
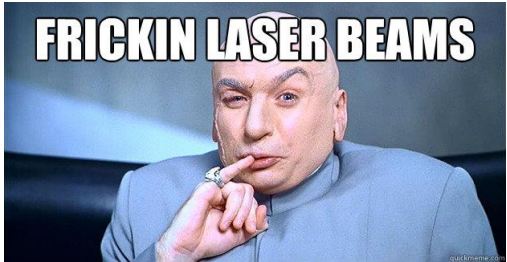
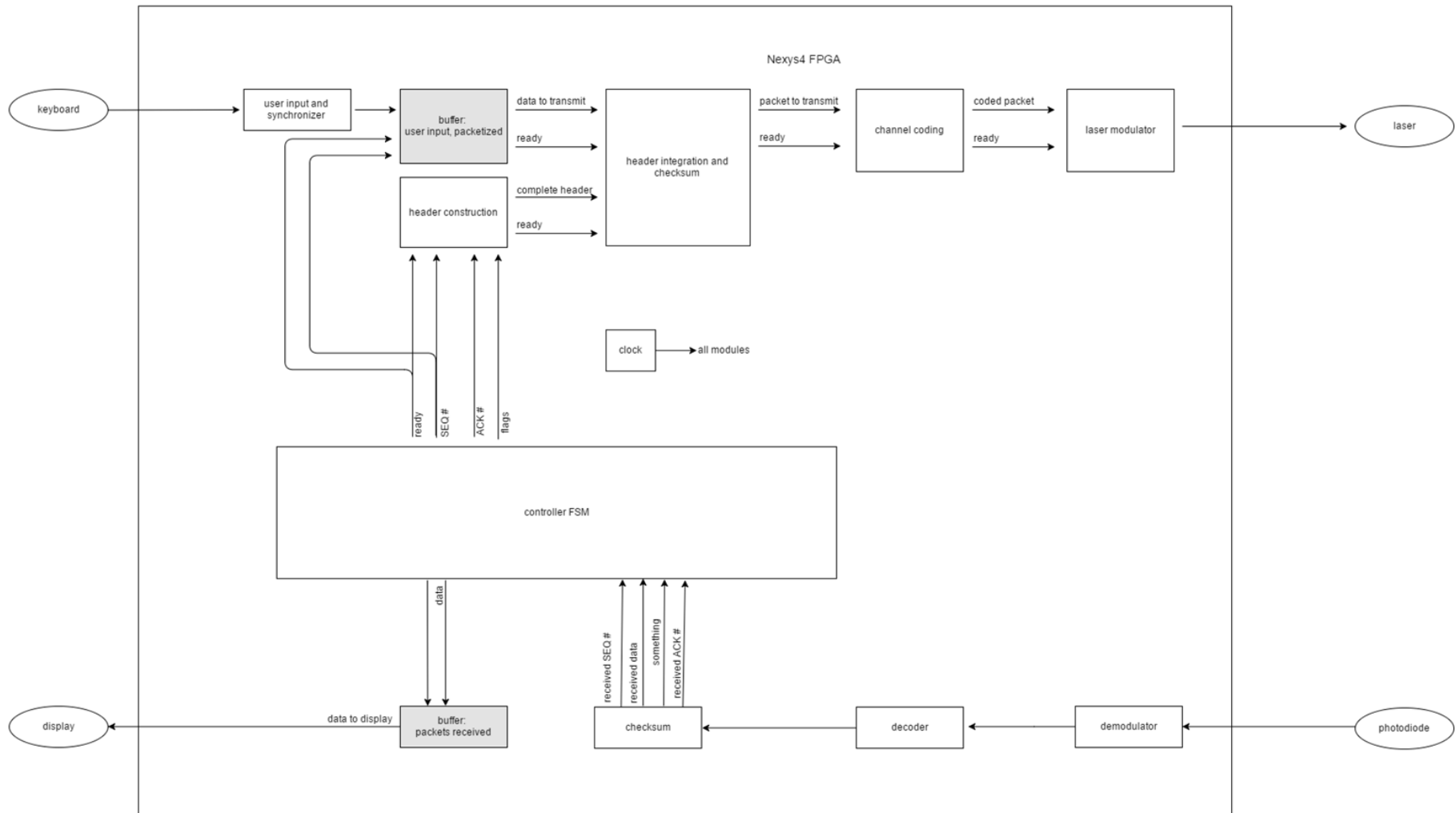


LASERNET

**amanda ke
allan ko
6.111**

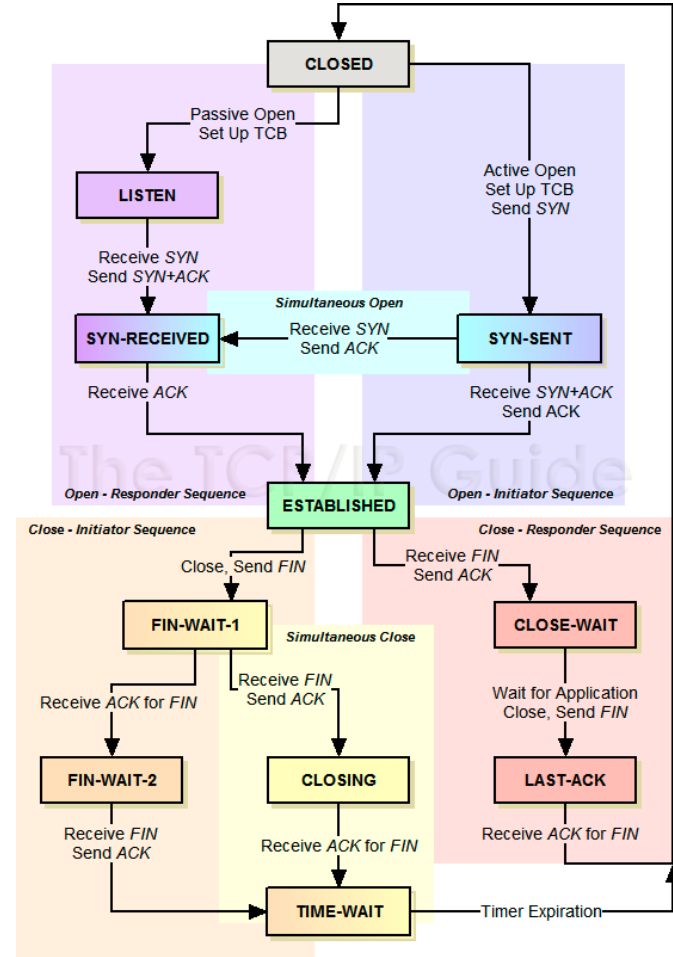
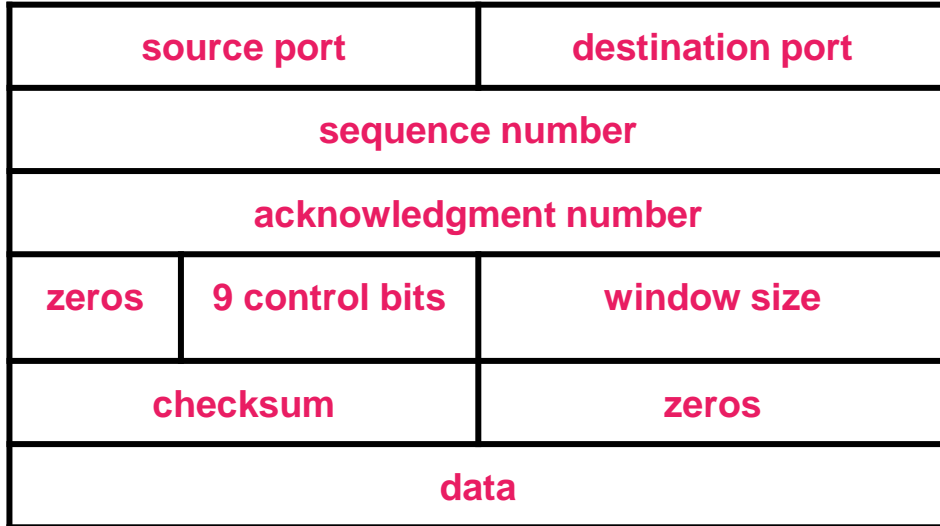






Module: Controller FSM and Implementing TCP

← 16 bits →



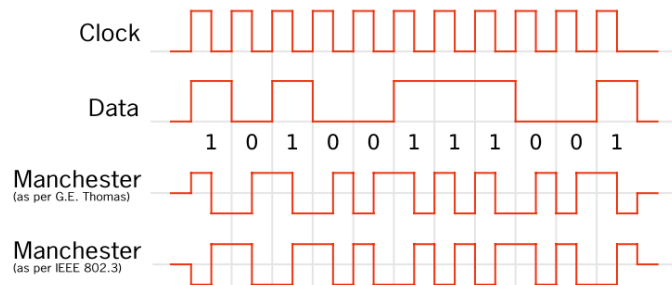
Module: Coding/Decoding

- Manchester encoding

- Encoding in which each data bit is either low then high, or high then low
- This ensures no DC bias

- Decoding

- Similar to Lab 5b, we will oversample the signal
 - 1. Sample and sync the data coming in
 - 2. Detect edges and start a counter
 - 3. Once an edge is detected, the next bit is available 3 cycles away



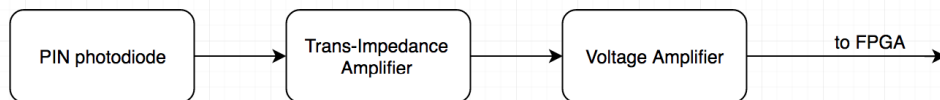
Laser Transmitter and Receiver and other hardware

— — — (Shoutout to 6.012!!!)

TRANSMITTER

- Modulation via varying the voltage is not a good idea.

RECEIVER



KEYBOARD

- PS/2 keyboard

MONITOR

- VGA display of character strings

Challenges and Stretch Goals

- Aligning transmitter and receiver over large distances
- TCP protocol may not be ideal for low latency applications
 - Switch to UDP protocol (transition isn't hard, simpler protocol)
- It would be cool implement VoIP or HD video streaming
 - Would require larger buffers
 - Faster data rates
- Incorporate multiple nodes (implement IP)

Schedule

	Allan	Amanda
Week of Oct 31	Refine software specification: memory requirements, inputs, outputs, timing Begin drafting state diagram for controlling FSM	Order analog components Complete analog circuits for (1) laser control and (2) data reception via photodiode
Week of Nov 7	Complete user input and laser control submodules	Complete photodiode input and user output submodules
	Integrate above submodules with basic FSM, demonstrate basic data transmission without headers, channel coding, packet acknowledgment, or error correction	
Week of Nov 14	Complete header construction and channel coding submodules	Complete channel decoding and error detection submodules
	Verify submodules with testbenches in simulation Project checkoff checklist meeting	

Schedule (cont.)

Week of Nov 21	<p>Integrate channel coding/decoding and TCP transmission protocols (headers, checksum, and packet acknowledgements) into the controlling FSM</p> <p>Test and verify successful connection, message transmission, and connection termination. This fulfills baseline requirements.</p>
Week of Nov 28	<p>Buffer week</p> <p>Work on stretch goals if baseline requirements complete</p>
Week of Dec 5	<p>Buffer week</p> <p>Work on stretch goals if baseline requirements complete</p> <p>Begin drafting final project report</p>
Week of Dec 12	<p>12/12 - Final project checkoff</p> <p>12/13 - Project demos and videotaping</p> <p>12/14 - Turn in final project report</p>

/sources

http://www.modulatedlight.org/optical_comms/using_laser_pointers.html

<http://www.jensign.com/opto/ledlaserdrivers/>

<http://web.mit.edu/6.111/www/f2005/handouts.html>

<http://fpga4fun.com/10BASE-T4.html>

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