Physics 314

Assignment 4, due Tuesday, Nov 15 2016

Topics: computer organization (review), serial & parallel data transmission, digital to analog (D/A), analog to digital (A/D)

Problems to hand in:

1. Noise on transmission lines can introduce errors in transmitted date (a low bit mis-read as a high bit, for example). To address this, various error detection (and sometimes correction) schemes are implemented. Find out about and briefly describe the *parity* and *cyclic redundancy check (CRC)* error correction schemes as they apply to serial data transmission.

2. A 1.000 V signal is converted to an 8-bit binary word through an ADC. The signal is then fed back into an 8-bit DAC. Assuming that both the DAC and the ADC range from 0 to 5.0 V, what would the output voltage of the DAC be? Show all work.

3. Below is a simplified 4-bit version of an R-2R ladder D/A converter. What is the output in volts for the following inputs (assuming logic low = 0 V and logic high is V_{hi})? Show all work for each part.

a) 0000

b) 1000

c) 0101