Prelab 06

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1. What is hysteresis and how does it help prevent bad behavior on digital inputs?

**A type of voltage thresholding, it changes the voltage threshold depending on the detected digital state.**

**It makes it impossible for a signal to consistently hang around the trigger point by moving the threshold up if the signal is in a low state or moving it down if the signal is high.**

1. What is quantization?

**The process of mapping a high-resolution signal to a manageable lower-resolution one. Basically flattens pieces of an input signal to make it representable in a certain number range.**

1. What does Nyquist theory explain? What is the problem with sampling a signal too slowly?

**Nyquist theory explains the relationship between how often an input signal should be sampled and whether or not the data is represented properly afterwards.**

**Sampling too slow will decrease the accuracy of the representation of the signal. The best way to sample a signal is to sample at a rate that is at least twice as fast as the fastest signal.**

1. The maximum resolution of the ADC is 12-bits. How many quantization steps/values does this give us?

**Since 8 bits equates to 256 steps, 12-bits is 4096**

1. What are the steps to perform an ADC calibration?

**Calibration can only be performed when the peripheral is stopped.**

1. **Ensure that ADEN = 0 and DMAEN = 0**
2. **Set ADCAL = 1**
3. **Wait until ADCAL = 0**
4. **The calibration factor can be read from bits 6:0 of ADC\_DR**
5. What’s the difference between right and left-aligned data in the DAC registers?

**The left is used for selecting the upper bits of a 16-bit number. The DAC can act on 16-bit data without any conversion or shifting this way.**

1. What DAC register would you use to write 8-bit to right-aligned data? (use the peripheral reference manual)

**DAC\_DHR8Rx[7:0] bits**

**DAC\_DHRx[11:4] bits**

1. Name something you found confusing or unclear in the lab manual. If everything was clear, simply answer that you didn’t have any issues.

**Following intuition is how I got my answer for #4 but am not entirely sure that is correct. Does the number of bits correlate to the number of quantization steps given?**