

Prelab for Lab #10: Analog to Digital Converter (ADC)

Week of 15 April 2019

Part A – Textbook Readings / Videos

1. Read Textbook Chapter 20 to review Analog/Digital Conversion.

Part B – Prelab assignment

In this lab we will set up the Analog Digital Converter (ADC) and use it to measure analog inputs from a potentiometer and from an infrared receiver.

1. Setting up pin PA1 as an analog input (for ADC)

You will need to set the following fields. Write the values to mask/set. If no mask is needed you can let that blank. You should use pre-defined names for the bits rather than raw hex values if at all possible.

- Set `GPIOA->MODER` for pin 1 to be “analog” (0b11).
MASK MODER=_____
- Set the `GPIOA->ASCR` bit for pin 1. This hooks up the Analog pin to the ADC.
MASK ASCR=_____
- VALUE MODER=_____
- VALUE ASCR=_____

2. Setting up the ADC

In this lab we will set up ADC1. We will be implementing the flowchart in Figure 20-12 in the textbook. This is not part of the prelab, but you can start implementing it if you want a head start on the Lab. If you are using Linux I don't have all the constants needed posted yet, but I will post them by Monday.

3. Question

You have the ADC set up with a 3V reference voltage and 12-bit resolution.

1. How many volts is each bit increment in the value read from the ADC equal to?
2. If you want to check if the input voltage is greater than 2V, what value from the ADC would you compare against?