Lab 4 Notes

Monday, March 5, 2018 7:17 PM

- Set TRIS Setting for Pin E2 for external POT
  (Look at Schematic Diagram in M Drive for Input or Output)
- In order to do ADC, you need to configure the A/D module and the function of the Port Pins
  ADCON0 & ADCON1 Registers

ADCON0 Register (Slide 49)

- Configures the A/D module
- 8-bit Register
- Bits 7-6: A/D conversion clock (use fosc/4)
- Bits 5-3: Analog Channel Selection (use quicklash schematic PDF)
- Bits 2: Start A/D, DO NOT start it until you are ready to do the actual ADC
- Bits 1: Leave as zero
- Bits 0: ON/OFF setting for A/D Module

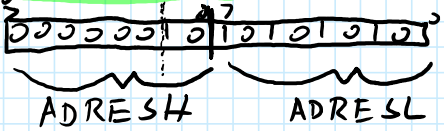
ADCON1 Register (slide 50)

- Configures the function of the port pins
- 8 bit Register
- Bits 7: Result Format (Left/Right Justification)
- Bits 6: A/D Conversion clock (same as ADCON0)
- Bits 5-4: Leave as 0
- Bits 3-0: Port Configuration Control bits
  Need Analog Input for Ch7 with reference to V_{DD} & V_{SS}

- Sampling rate needs to be set before and after ADCON0bits.GO
  - Delay of X- amount of ms

ADC SFRs (Slide 48)

- ADRESH & ADRESL
  - Register Pair is 16-bits wide
  - Result is 10-bit wide and can be right/left justified
  - Extra bits are loaded with zeros
- Right Justified



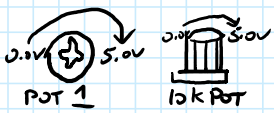
- Need to combine ADRESH & ADRESL
  - Bit-shift ADRESH left by the size of ADRESL
  - Then combine

!!! Note: Do not work on SFRs directly, store them to a variable

Displaying Voltage (Slides 36-40)

- Display Voltage from 0.0V to 5.0V
- Problem: ADC gives 10-bit result
- Solution: ADC gives 10-bit result, so result ranges in value up to 10-bit
  10-bit = 2^{10} = ?
  - Result ranges from 0.0 to ?
  - Simply scale this range to go from 0.0 to 5.0 (use equation)

Keep in mind tenths place may be difficult to display instead you can scale 0-50 and split that



- Do this for both potentiometers

Comparing Voltages

- Make a comparison of the current values for each voltage and light up respective LED
  - Use Schematic Diagram to find LED Port
  - TRIS settings
  - Write to port a 1 or 0 to turn ON/OFF

Look at slide 66 for programming example