Lab 5 Notes

Tuesday, April 3, 2018 11:56 AM

- With Lab 4 (ADC), 85% of Lab 5 is done with ADC is used for reading the 2 potentiometers
- with DAC, we are going to use oscilloscope to view the output (Sinewave)
- PIC doesn't have on board DAC but QwikFlash has MAX 522 chip where outputs DAC voltage through 2 pins: Out A & Out B
  - Hook up Oscilloscope to A, (Pin Headers above MAX Chip)
- 2 connections to MAX
  - DIN Pin: Serial data input of the 16 bit shift Register. Data clocked on rising edge of SCLK
  - CS Pin: Chip Select (active low): Enables data to be shifted into the 16-bit shift Register. Programing commands executed on rising edge of $\overline{CS}$
- DAC SFRs
  - SSPSTAT
  - SSPCON1
  - SSPBUF
- DAC Lecture 10 slide 21,22
  - only have to set bits with the red arrows, all others are ignored with zeros

DAC

- Enable CS & DIN → Set TRIS for RC5(DIN) & RC0($\overline{CS}$) (active low)
  then in your DAC Function Set them with PORT
- Send ControlByte (MAX PDF in MDrive pg 9)
- Wait for it to finish transmitting - while(SSPSTATbits.BF==0);
- Then Send Sinewave Data - Sinewave = amplitude * sin(2π freq time)
- Wait for it to finish transmitting
- Disable MAX522 chip when done

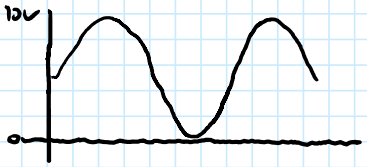
Ext POT — 3.14159 — Int POT — Create with a loop increment by 0.001 to 1 for enough samples for a better wave

Sinewave

Sinewave = amplitude * sin(2π freq time)

Fix it to scale with oscilloscope from 0V-255V

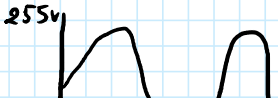
Sinewave += 5 // offset to have only positive values

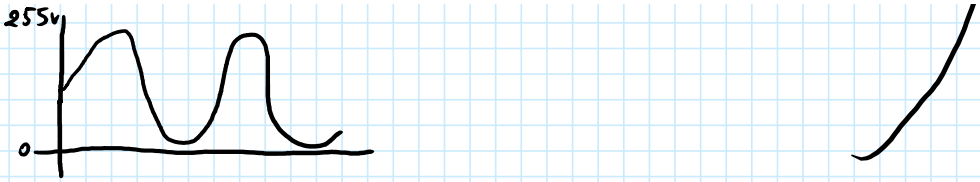


Sinewave = Sinewave/10 // scale it down to 0V-1V

Just do it in one step

Sinewave = Sinewave * 255 // scale to 0-255V





- Awesome, but why are we scaling the wave?
- DIN pin takes 16 bit, 2-8 bit values.
  The sine wave is the 2nd 8-bit value, as you may know
  ... 8 bit in size $2^8 = 256$

  So scale from 0-255