**1.0 Objectives** • To develop software debugging techniques,

- Performance debugging (dynamic or real time)

- Profiling (detection and visualization of program activity)

• To dump time and data values into arrays

• To learn how to use the oscilloscope and logic analyzer,

• To experience concepts of real time, probability mass function and Central Limit Theorem

• To observe critical sections,

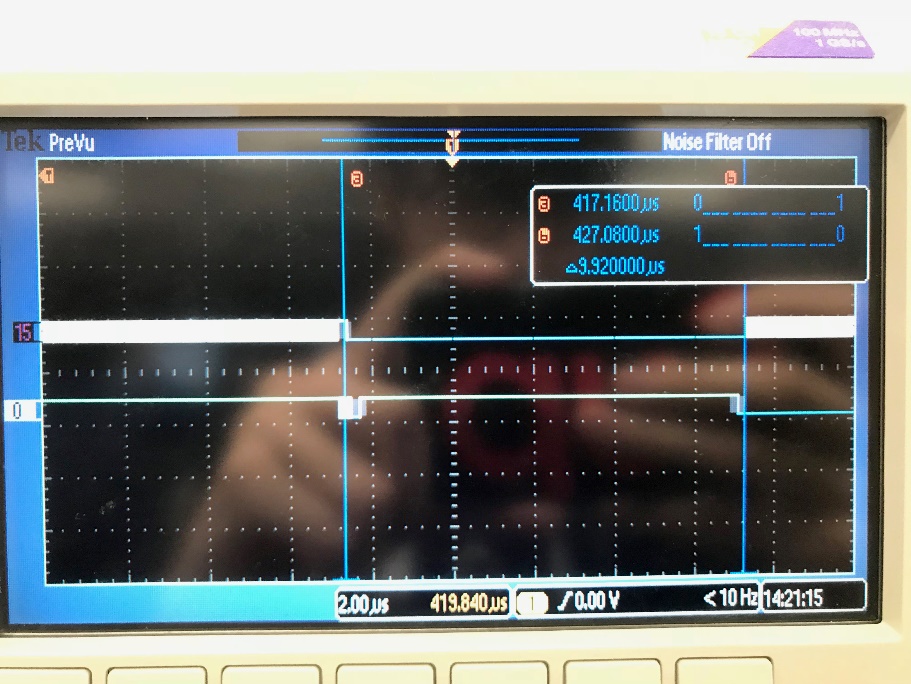
• Get an early start on Lab 3, by writing a line drawing function.

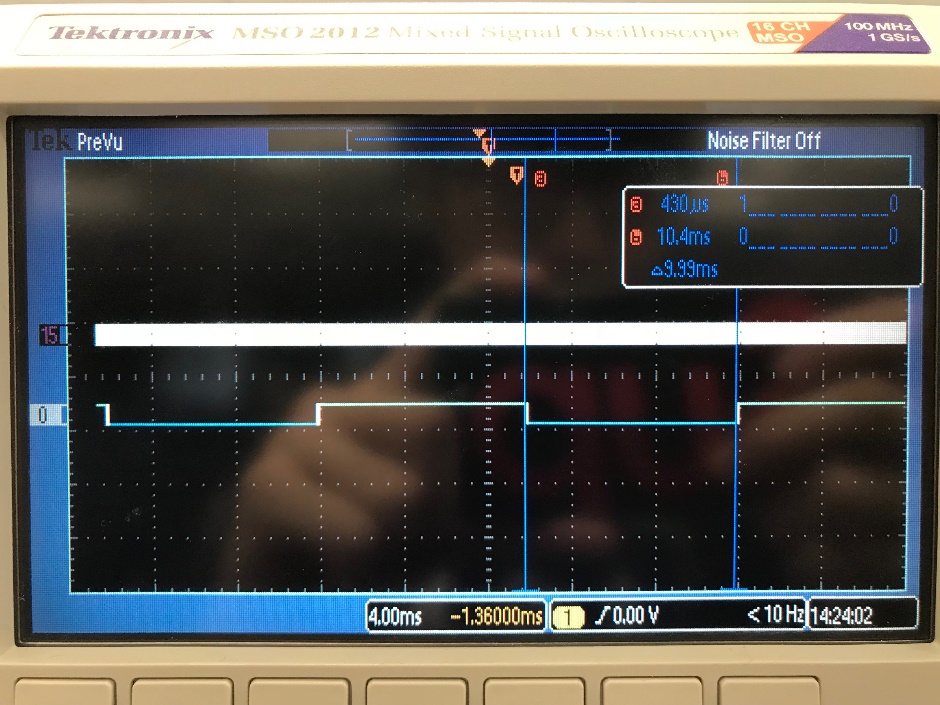
**2.0 Analysis and Discussion**

**Procedure A:**



**Procedure B:**





**Procedure C:**

PF2 is toggling incorrectly.

Steps that causes this to happen:

1. Main function toggling PF1, ISR happens before main function can store back the toggled value at
2. ISR toggles PF2 and stores back the toggled value of Port F, then it returns to main program
3. Main function continues and stores toggled value before ISR occurred
4. The newly stored value overwrites the Port F values previously by the ISR.

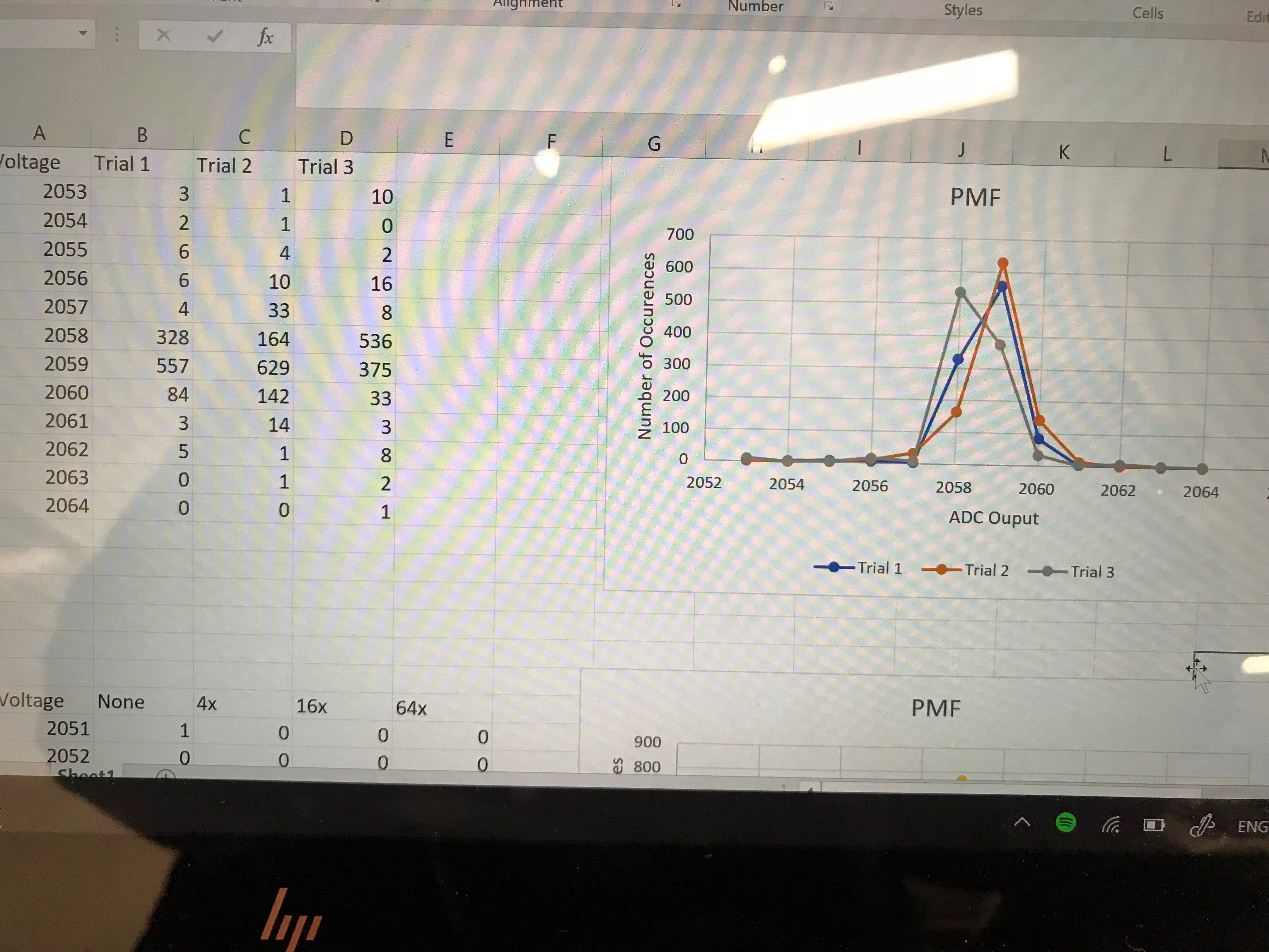
To prevent this from happening, we can disable interrupt every time before we toggle change Port F in main.

**Procedure D:**

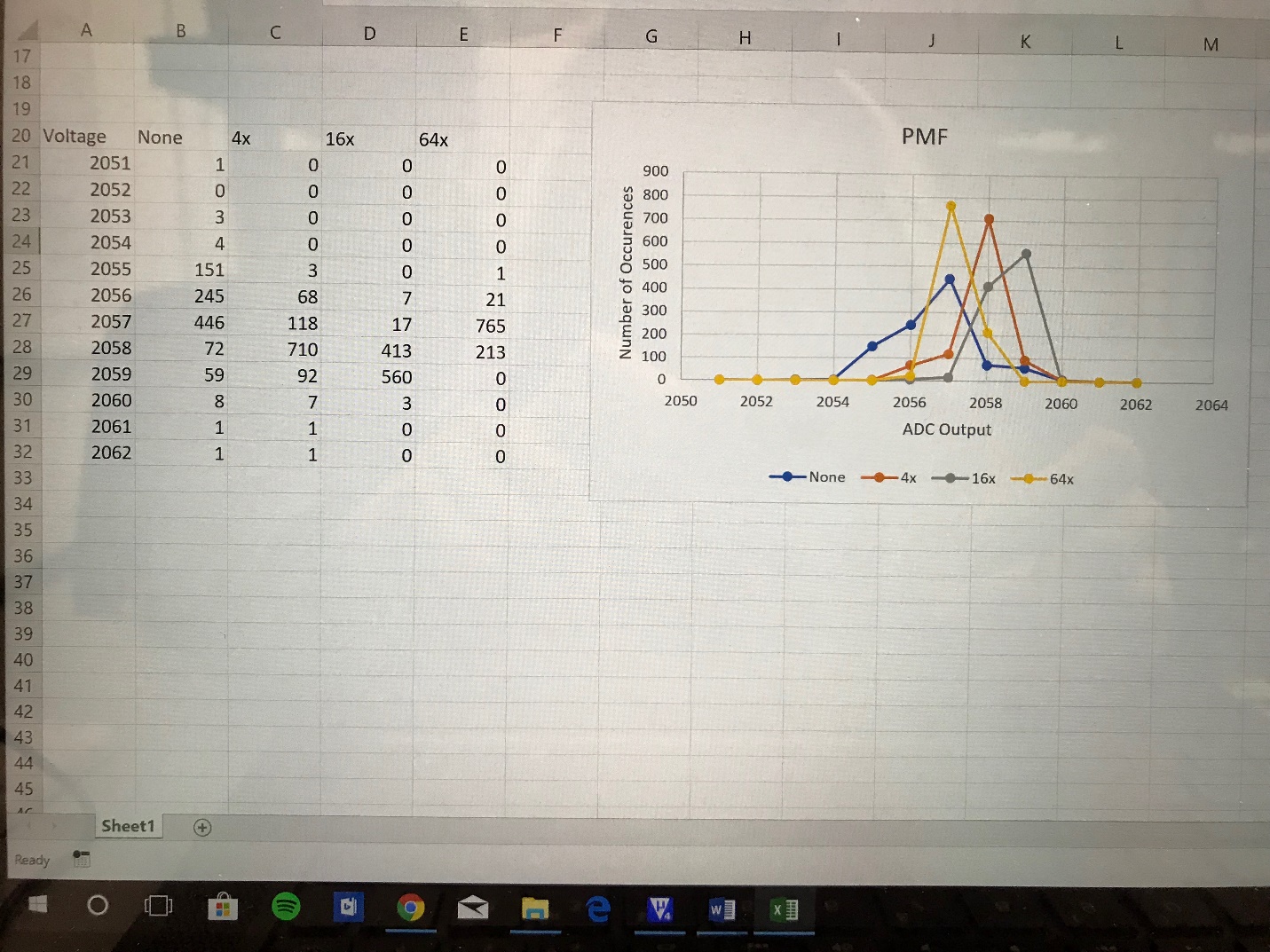
time jitter with just the one sampling interrupt active: 6

time jitter with three sampling interrupts active: 15

**Procedure E:**



**Procedure F:**



x64: 512 us

x16: 124 us

x4: 33us

None: 10 us