

Wabash Capstone Project Notes 04

By: John Danison

What Did I Say I Would Do This Week?



Continue to refine the noise readings in strain gauge.



Continue creating schematics in Altium Designer

What I Have Done Over The Past Week



Wrote code to assist in finding the best physical circuit.



Began going through different configurations attempting to find the most optimal solution.



Started physically constructing the new microphone wire cable.



Attended the meeting with the Wabash team.

Noise Reduction – Supporting Evidence

Using Python, I wrote code to automatically capture the output of the continuous monitoring mode.

It then imports this data into excel and automatically finds the averages, maxes, mins, and graphs the data over time.

Each iteration I change the physical circuit with hopes to find and prove the most effective option.

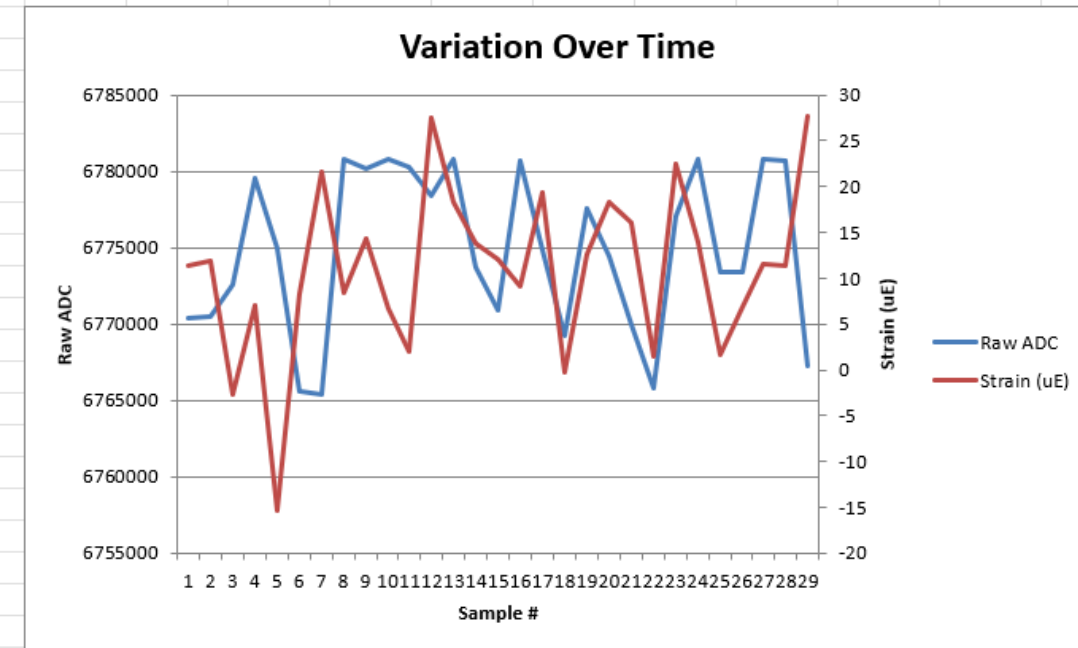


```
main.cpp capture_monitor_to_excel.py PIO Home platformio.ini NAU7802_Module.cpp
```

```
tools > capture_monitor_to_excel.py > ...  
1 import argparse  
2 import sys  
3 import time  
4 from datetime import datetime  
5 from pathlib import Path  
6 import re  
  
7  
8 import pandas as pd  
9 import serial  
  
10  
11  
12 ROW_PATTERN = re.compile(  
13     r"^\\s*([0-9]+(?:\\. [0-9]+)?)\\s*, \\s*([0-9]+)\\s*, \\s*(-?\\d+)\\s*, \\s*(-?\\d+)\\s*, \\s*(-?\\d+)\\s*, \\s*(-?\\d+)\\s*, \\s*  
14 )  
  
15  
16  
17 def build_output_path(workspace_root: Path) -> Path:  
18     return build_output_path_with_label(workspace_root, None)  
  
19  
20  
21 def sanitize_label(label: str) -> str:  
22     cleaned = re.sub(r"[^A-Za-z0-9_-]", "-", label.strip())  
23     cleaned = re.sub(r"-+", "-", cleaned).strip("-")  
24     return cleaned[:60] if cleaned else "session"  
  
25  
26  
27 def build_output_path_with_label(workspace_root: Path, label: str | None) -> Path:  
28     output_dir = workspace_root / "excel-results"
```

Noise Reduction – Supporting Evidence

Test Conditions Label	Configuration 1			
General Notes	Generated At: 2026-02-23 20:21:44			
Filtered AVV line?	Yes	AVV capacitor values	10ohm, 0.1uF, 10nF	
Filtered ADC line?	Yes	ADC capacitor values	4.5nF for A+ and A-	
Filtered A+ and A- wires?	No			
Continuous Monitoring Summary				
ADC Variation & Extremes				
Raw ADC High	Raw ADC Low	Avg ADC Variation		
6780795	6765381	4986.928571		
Strain Variation & Extremes				
Strain High (uE)	Strain Low (uE)	Avg Variation Strain Step (uE)		
27.75	-15.32	10.45392857		
Sample Time Variation & Extremes				
Sample Time High (ms)	Sample Time Low (ms)	Avg Sample Time (ms)	Total Samples	29
2003	1971	2000.827586	Total Time (s)	60.83
Timing details are available on the Timing tab.				



Did I Do What I Say I Would Do?

I feel that I am still doing what I said I would do. I do feel that I am starting to get behind.

I am wanting to use this weekend to finish up the noise filtering things in preparation for the physical calibration.

I fell ill during this week but still managed to get myself to lecture and lab on Tuesday. I unfortunately had to miss Lab on Thursday due to this illness.

Plans For Upcoming Weeks

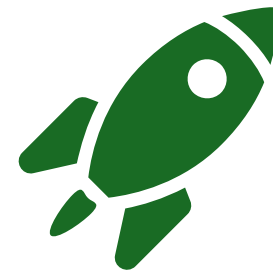


High Level

Continue to refine system sensors & configuration.

Continue to learn how to use Altium Designer.

Continue to show up to class.



By EOW:

Finish Noise Reduction. Prepare for Physical Calibration.

Continue creating schematics in Altium Designer if time allows.