TECHIN514-Lab2-Peizhong Gao

1.Your selected resistors and the calculations you made

- **First, all of the standard register values refer to the following sheet:**

精度为 1%的金属膜电阻，以欧姆为单位的标称值：

10	33	100	332	1K	3.32K	10.5K	34K	107K	357K
10.2	33.2	102	340	1.02K	3.4K	10.7K	34.8K	110K	360K
10.5	34	105	348	1.05K	3.48K	11K	35.7K	113K	365K
10.7	34.8	107	350	1.07K	3.57K	11.3K	36K	115K	374K
11	35.7	110	357	1.1K	3.6K	11.5K	36.5K	118K	383K
11.3	36	113	360	1.13K	3.65K	11.8K	37.4K	120K	390K
11.5	36.5	115	365	1.15K	3.74K	12K	38.3K	121K	392K
11.8	37.4	118	374	1.18K	3.83K	12.1K	39K	124K	402K
12	38.3	120	383	1.2K	3.9K	12.4K	39.2K	127K	412K
12.1	39	121	390	1.21K	3.92K	12.7K	40.2K	130K	422K
12.4	39.2	124	392	1.24K	4.02K	13K	41.2K	133K	430K
12.7	40.2	127	402	1.27K	4.12K	13.3K	42.2K	137K	432K
13	41.2	130	412	1.3K	4.22K	13.7K	43K	140K	442K
13.3	42.2	133	422	1.33K	4.32K	14K	43.2K	143K	453K
13.7	43	137	430	1.37K	4.42K	14.3K	44.2K	147K	464K
14	43.2	140	432	1.4K	4.53K	14.7K	45.3K	150K	470K
14.3	44.2	143	442	1.43K	4.64K	15K	46.4K	154K	475K
14.7	45.3	147	453	1.47K	4.7K	15.4K	47K	158K	487K
15	46.4	150	464	1.5K	4.75K	15.8K	47.5K	160K	499K
15.4	47	154	470	1.54K	4.87K	16K	48.7K	162K	511K
15.8	47.5	158	475	1.58K	4.99K	16.2K	49.9K	165K	523K
16	48.7	160	487	1.6K	5.1K	16.5K	51K	169K	536K
16.2	49.9	162	499	1.62K	5.11K	16.9K	51.1K	174K	549K
16.5	51	165	510	1.65K	5.23K	17.4K	52.3K	178K	560K
16.9	51.1	169	511	1.69K	5.36K	17.8K	53.6K	180K	562K
17.4	52.3	174	523	1.74K	5.49K	18K	54.9K	182K	576K
17.8	53.6	178	536	1.78K	5.6K	18.2K	56K	187K	590K
18	54.9	180	549	1.8K	5.62K	18.7K	56.2K	191K	604K
18.2	56	182	560	1.82K	5.76K	19.1K	57.6K	196K	619K
18.7	56.2	187	562	1.87K	5.9K	19.6K	59K	200K	620K
19.1	57.6	191	565	1.91K	6.04K	20K	60.4K	205K	634K
19.6	59	196	578	1.96K	6.19K	20.5K	61.9K	210K	649K
20	60.4	200	590	2K	6.2K	21K	62K	215K	665K
20.5	61.9	205	604	2.05K	6.34K	21.5K	63.4K	220K	680K
21	62	210	619	2.1K	6.49K	22K	64.9K	221K	681K
21.5	63.4	215	620	2.15K	6.65K	22.1K	66.5K	226K	698K
22	64.9	220	634	2.2K	6.8K	22.6K	68K	232K	715K
22.1	66.5	221	649	2.21K	6.81K	23.2K	68.1K	237K	732K
22.6	68	226	665	2.26K	6.98K	23.7K	69.8K	240K	750K
23.2	68.1	232	680	2.32K	7.15K	24K	71.5K	243K	768K
23.7	69.8	237	681	2.37	7.32K	24.3K	73.2K	249K	787K
24	71.5	240	698	2.4K	7.5K	24.9K	75K	255K	806K
24.3	73.2	243	715	2.43K	7.68K	25.5K	76.8K	261K	820K
24.7	75	249	732	2.49K	7.87K	26.1K	78.7K	267K	825K
24.9	75.5	255	750	2.55K	8.06K	26.7K	80.6K	270K	845K
25.5	76.8	261	768	2.61K	8.2K	27K	82K	274K	866K
26.1	78.7	267	787	2.67K	8.25K	27.4K	82.5K	280K	887K
26.7	80.6	270	806	2.7K	8.45K	28K	84.5K	287K	909K
27	82	274	820	2.74K	8.66K	28.7K	86.6K	294K	910K
27.4	82.5	280	825	2.8K	8.8K	29.4K	88.7K	300K	931K
28	84.5	287	845	2.87K	8.87K	30K	90.9K	301K	953K
28.7	86.6	294	866	2.94K	9.09K	30.1K	91K	309K	976K
29.4	88.7	300	887	3.0K	9.1K	30.9K	93.1K	316K	1.0M
30	90.9	301	909	3.01K	9.31K	31.6K	95.3K	324K	1.5M
30.1	91	309	910	3.09K	9.53K	32.4K	97.6K	330K	2.2M
30.9	93.1	316	931	3.16K	9.76K	33K	100K	332K	
31.6	95.3	324	953	3.24K	10K	33.2K	102K	340K	
32.4	97.6	330	976	3.3K	10.2K	33.6K	105K	348K	

- **LM317_SOT-223**

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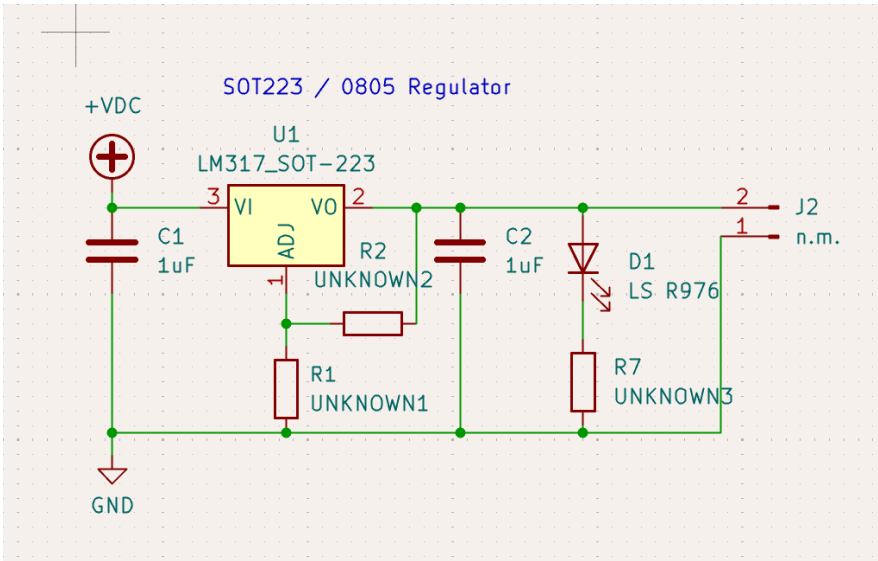

- **From dataset, we get Formula:** VOUT1 ≈ 1.25 (VREF) * (1 + R1 / R2)

- make the output voltage (VOUT1) equal to 2V + 0.01 * the day of the month you were born, My day is 21th, so VOUT1 = 2V + 0.01 * 21 = **2.21V**

- **VOUT1 = 2.21V =** 1.25 * (1 + R1 / R2)
- R1 / R2 = 0.768
- **Dataset recommend R2 = 240Ω**, So R1 = 184.32Ω, **according to standard value, R1 should be 182Ω**

- **LS R976**
  - **From the dataset, we know the Voltage of LED is around 2.0V, so we assume that LED will share 2.0V, so VR = 2.21V - 2.0V = 0.21V**
  - Standard I = 20mA, IMAX = 25mA (from data sheet)
  - R7 = 10.5Ω, **according to standard value, R7 should be 10Ω**

- **TPS79301**

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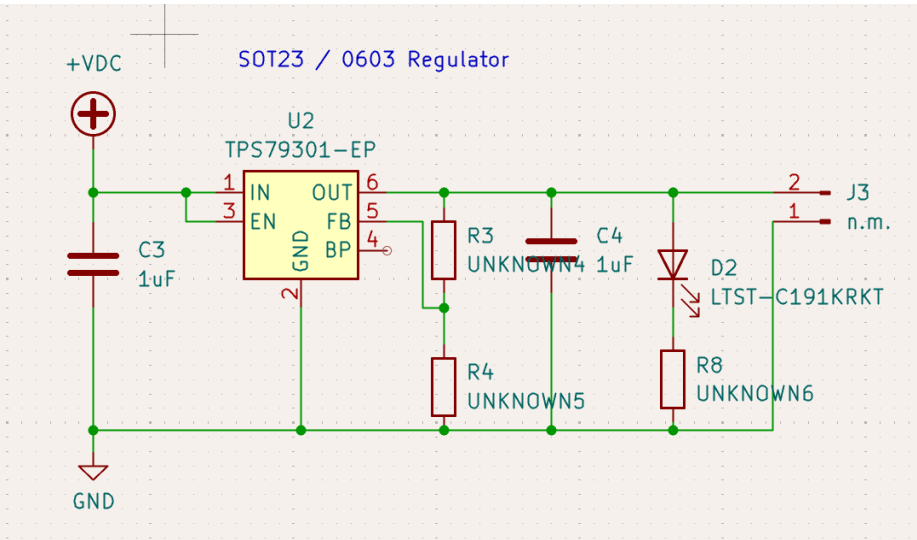

- **From dataset, we get Formula:** VOUT2 ≈ 1.2246 (VREF) * (1 + R3 / R4)

- make the output voltage (VOUT2) equal to 0.1 + VOUT1, so VOUT2 = 0.1 + 2.21V = **2.31V**

- **VOUT2 = 2.31V =** 1.2246 * (1 + R3 / R4)
- R3 / R4 = 0.886
- **Dataset recommend R4 = 30.1kΩ**, So R3 = 26.68kΩ, **according to standard value, R3 should be 26.7kΩ**

- **LTST-C191KRKT**
  - **From the dataset, we know the Voltage of LED is around 2.0V, so we assume that LED will share 2.0V, VR = 2.31V - 2V = 0.31V**
  - Standard I = 20mA (from data sheet)
  - R8 = 15.5Ω, **according to standard value, R8 should be 15Ω**

- **MIC5377**

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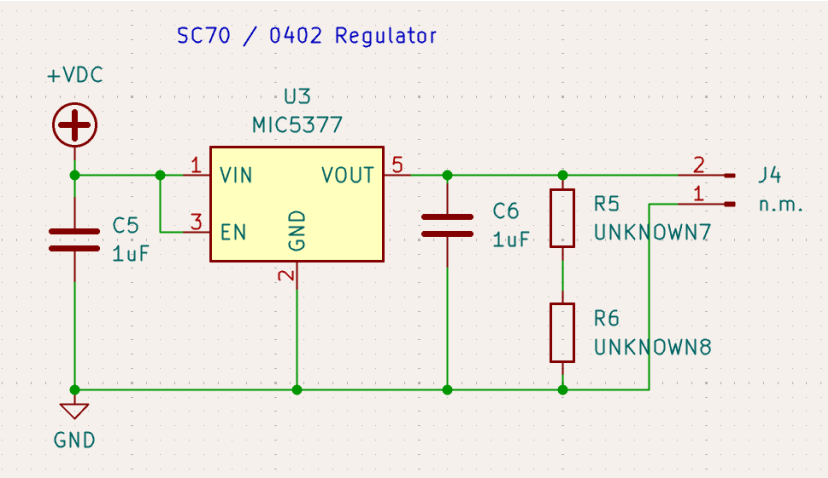

- **From dataset, we get Formula:** VOUT3 ≈ 1.0 (VREF) * (1 + R5 / R6)

- make the output voltage (VOUT3) equal to VOUT2 = **2.31V**

- **VOUT3 = 2.31V =** 1.0 * (1 + R5 / R6)
- R5 / R6 = 1.31
- **Dataset recommend R6 = 267kΩ**, So R5 = 349.77kΩ, **according to standard value, R5 should be 348kΩ**

- **However, in MSTI resister Book, we only get some of value, so the final choices are:**
  - R1 = 180Ω
  - R2 = 240Ω
  - R3 = 27kΩ
  - R4 = 30kΩ
  - R7 = 10Ω
  - R8 = 15Ω

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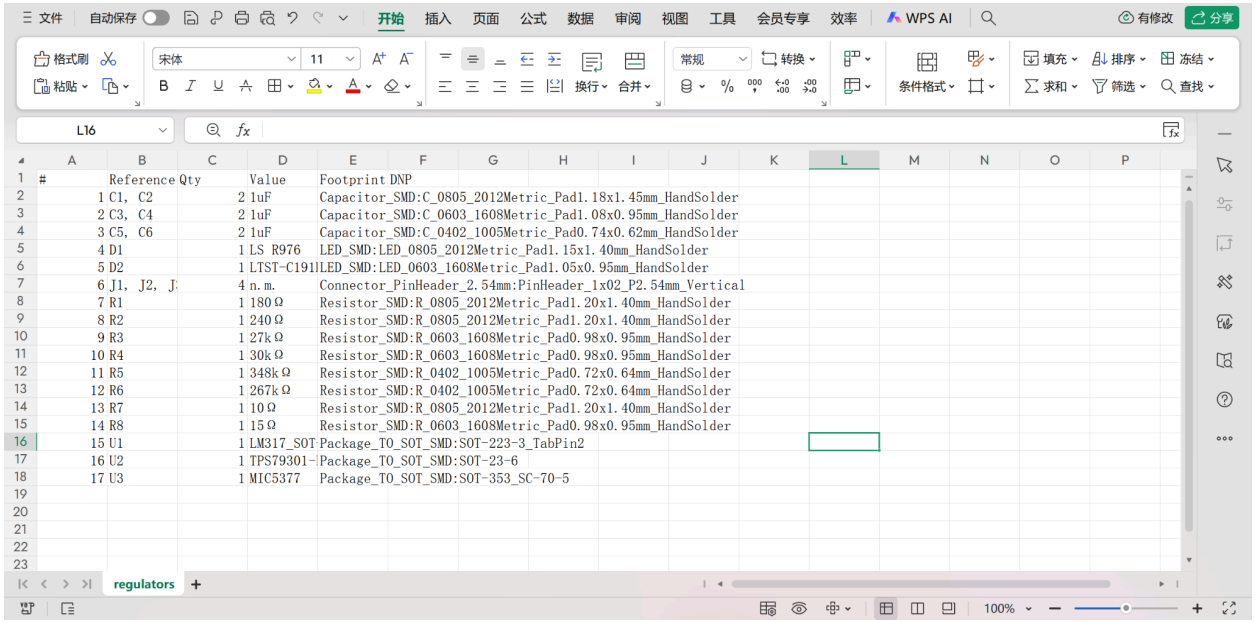
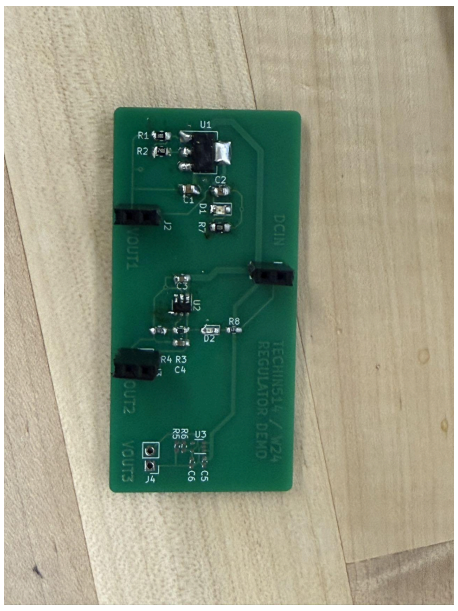
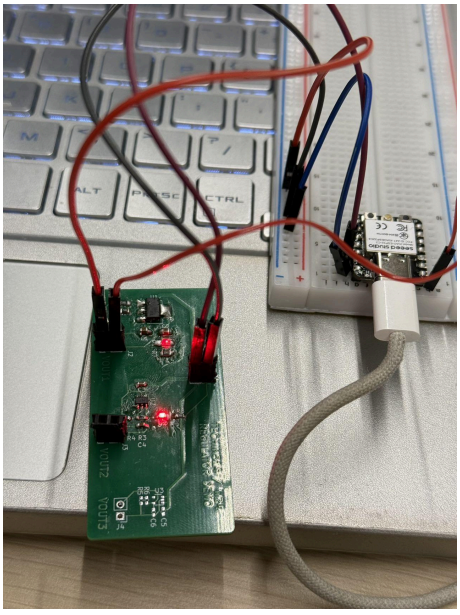
2.Screenshot of the exported BOM spreadsheet, with values filled in



#	Reference	Qty	Value	Footprint	DNP
1	C1, C2	2	1uF	Capacitor_SMD:C_0805_2012Metric_Pad1.18x1.45mm_HandSolder	
2	C3, C4	2	1uF	Capacitor_SMD:C_0603_1608Metric_Pad1.08x0.95mm_HandSolder	
3	C5, C6	2	1uF	Capacitor_SMD:C_0402_1005Metric_Pad0.74x0.62mm_HandSolder	
4	D1	1	LS R976	LED_SMD:LED_0805_2012Metric_Pad1.15x1.40mm_HandSolder	
5	D2	1	LTST-C191	LED_SMD:LED_0603_1608Metric_Pad1.05x0.95mm_HandSolder	
6	J1, J2, J	4	n.m.	Connector_PinHeader_2.54mm:PinHeader_1x02_P2.54mm_Vertical	
7	R1	1	180Ω	Resistor_SMD:R_0805_2012Metric_Pad1.20x1.40mm_HandSolder	
8	R2	1	240Ω	Resistor_SMD:R_0805_2012Metric_Pad1.20x1.40mm_HandSolder	
9	R3	1	27kΩ	Resistor_SMD:R_0603_1608Metric_Pad0.98x0.95mm_HandSolder	
10	R4	1	30kΩ	Resistor_SMD:R_0603_1608Metric_Pad0.98x0.95mm_HandSolder	
11	R5	1	348kΩ	Resistor_SMD:R_0402_1005Metric_Pad0.72x0.64mm_HandSolder	
12	R6	1	267kΩ	Resistor_SMD:R_0402_1005Metric_Pad0.72x0.64mm_HandSolder	
13	R7	1	10Ω	Resistor_SMD:R_0805_2012Metric_Pad1.20x1.40mm_HandSolder	
14	R8	1	15Ω	Resistor_SMD:R_0603_1608Metric_Pad0.98x0.95mm_HandSolder	
15	U1	1	LM317_SOT	Package_TO_SOT_SMD:SOT-223-3_TabPin2	
16	U2	1	TPS79301-	Package_TO_SOT_SMD:SOT-23-6	
17	U3	1	MIC5377	Package_TO_SOT_SMD:SOT-353_SC-70-5	

3.A picture of your board





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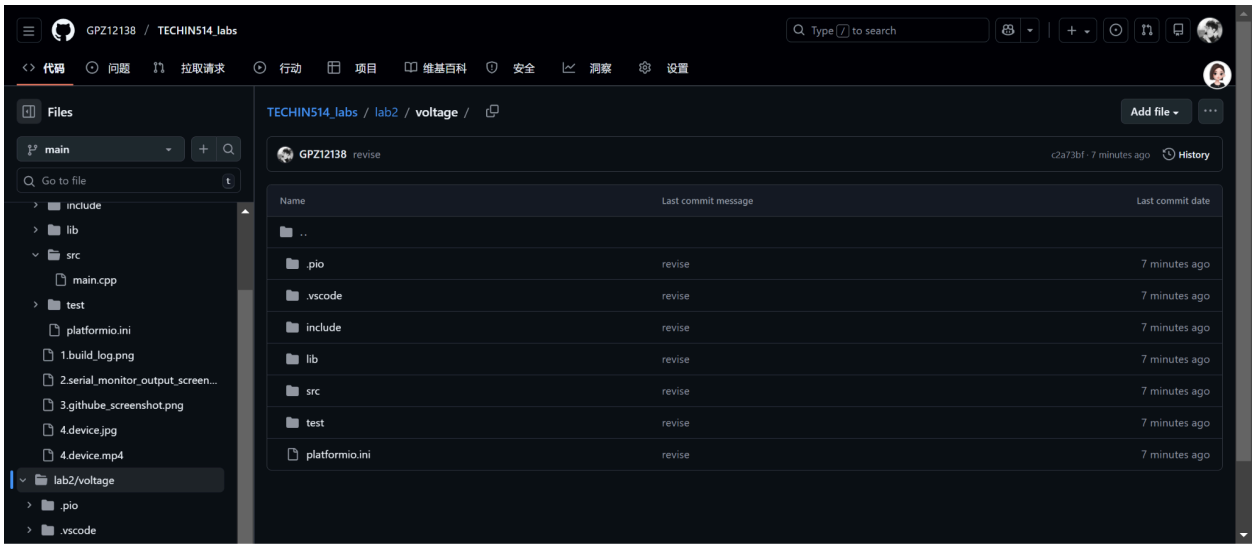
4.Link to GitHub repo of your ESP32 code

- **link:**

https://github.com/GPZ12138/TECHIN514_labs/tree/main/lab2/voltage

- **screenshot:**



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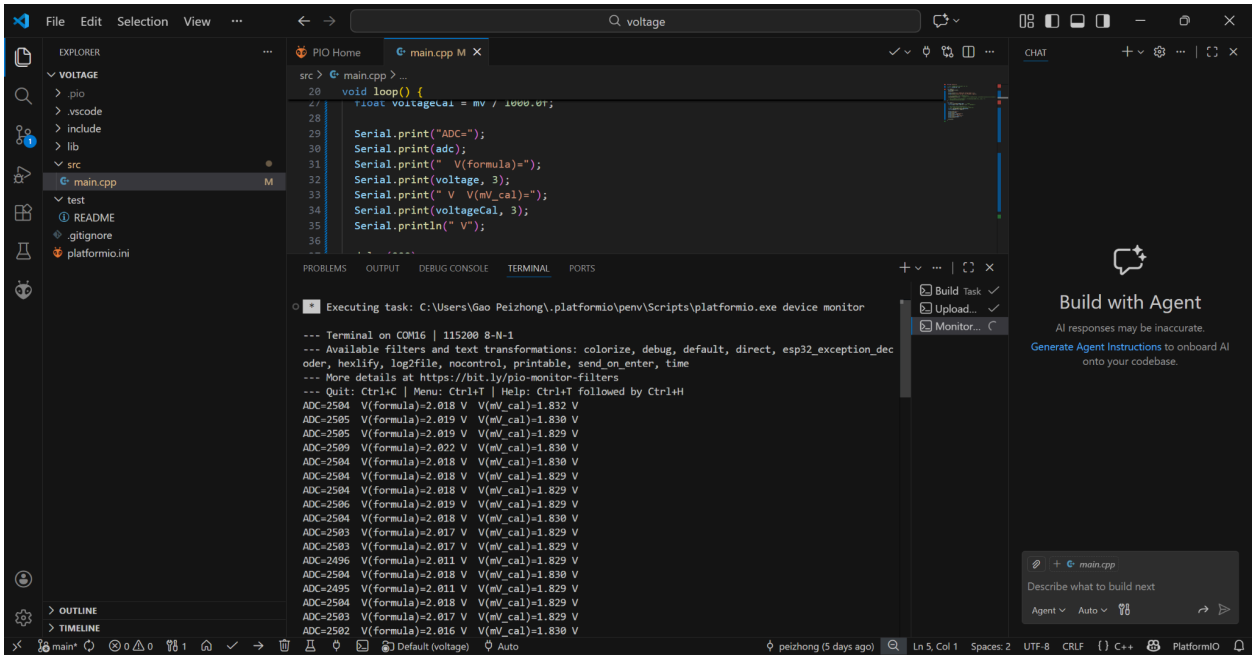
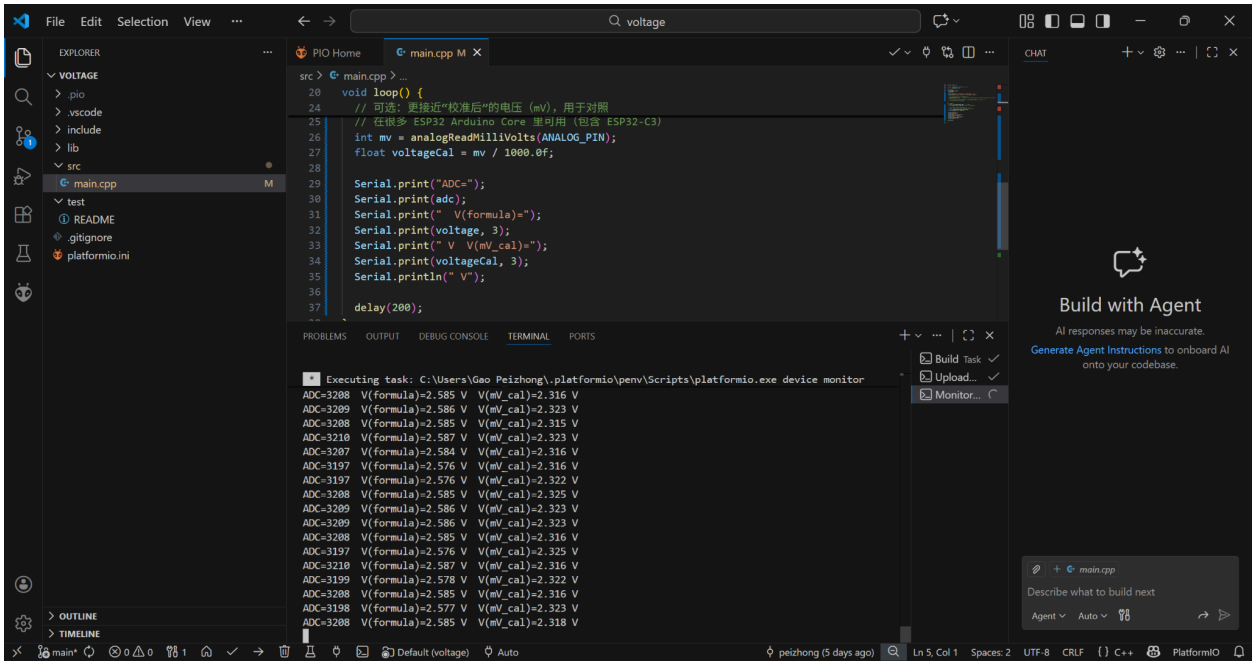
5.Screenshot of the serial output from your ESP32 (zeros are okay if you get a non-functioning board)

- **For unit with LM317_SOT-223**



- **For unit with TPS79301-EP**



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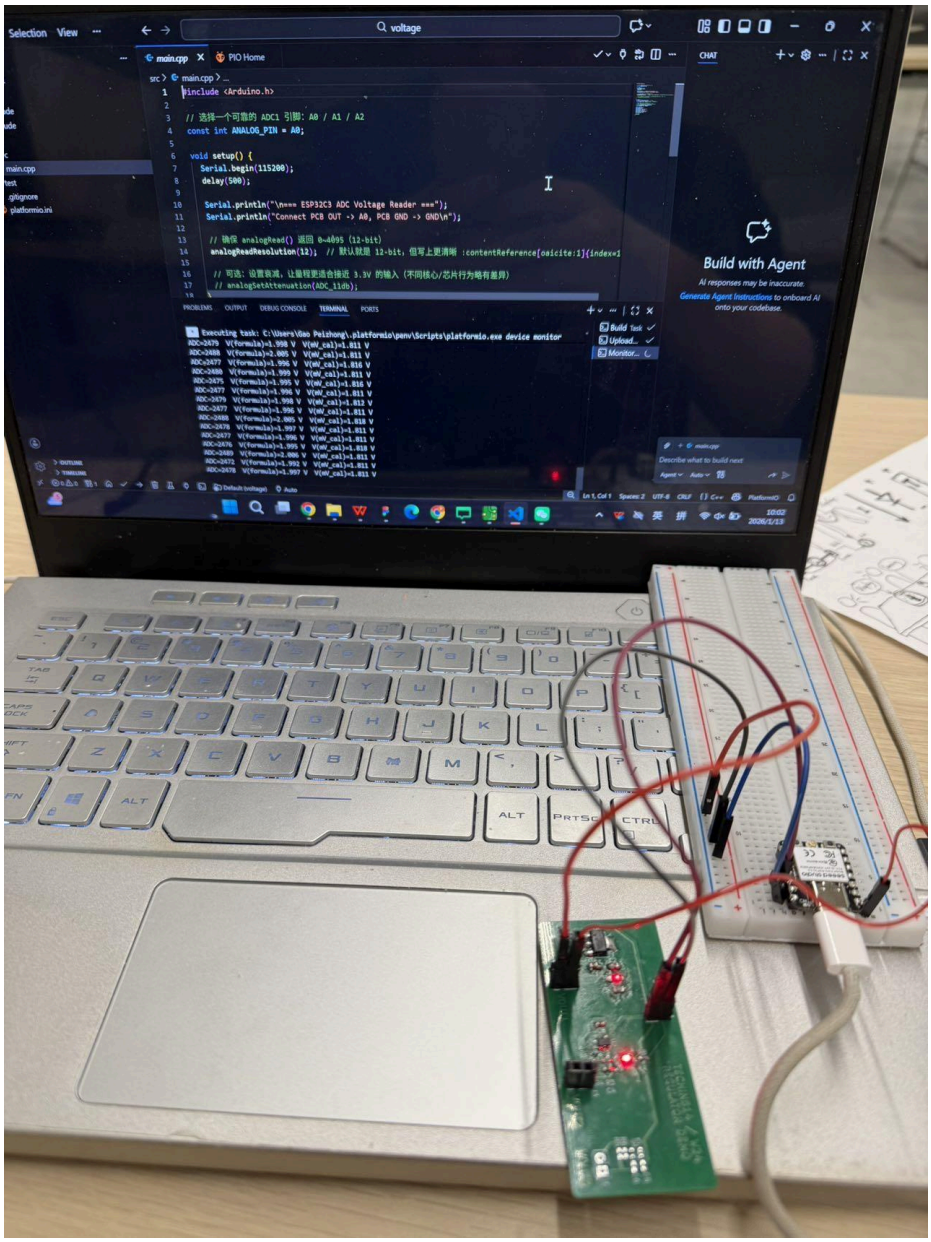

6.Collaboration (extra)

- I helped Mengqi Shi and Mengyuan Xiong by demonstrating how to solder small SMT components and explaining how to use the tools.
- Weiye Xu and Ruotong (Fiona) Yu helped me debug the circuit when my LED did not light up.