

Lab2 EE Fundamentals Lab Report

Linghao Meng 2430494

1 Calculation

1.1 VOUT

LM317 regulator VOUT1: 2.02V

TPS79301 regulator VOUT2: 2.12V

MIC5377 regulator VOOUT3: 2.12V

1.2 LM317

$$V_{out} = V_{ref} \left(1 + \frac{R_2}{R_1}\right) + I_{adj} \times R_2 \quad (1)$$

Vref = 1.25V

Typically 'R1' is 240Ω, so $2.02V = 1.25V \times (1 + R_2 / 240\Omega)$, we can get 'R2'=147.8Ω

However, 'R2' is actually R1, 'R1' is actually R2, which could be a mistake.

So, R1 = 147.8Ω, R2 = 240Ω

$$R_7 = \frac{V_{out} - V_F}{I_{led}} \quad (2)$$

Forward current for LS R976 is 20mA, Vf is 2V

R7 = 10Ω

1.3 TPS79301

$$V_{out} = V_{ref} \times \left(1 + \frac{R_1}{R_2}\right) \quad (3)$$

Vref = 1.2246V

The recommended design procedure is to choose 'R2' = 30.1 kΩ

So the 'R1' = 22 kΩ

'R1' is actually R3, 'R2' is actually R4

So, R3 = 22kΩ, R4 = 30.1Ω

Forward current for LS R976 is 20mA, Vf is 2V

R8 = 6Ω

1.4 MIC5377

$$V_{out} = V_{ref} \times \left(1 + \frac{R_1}{R_2}\right) \quad (4)$$

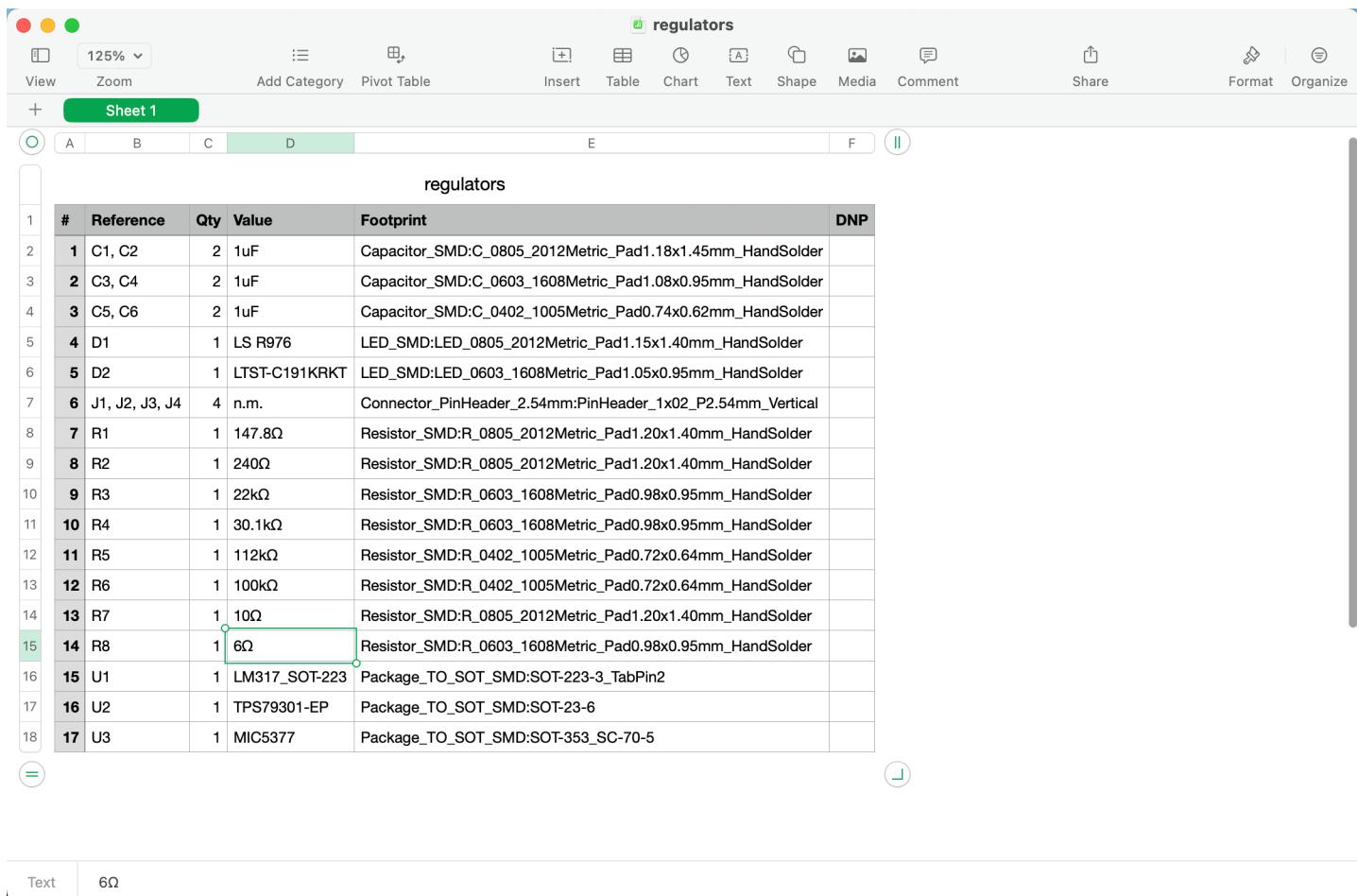
Vref = 1V

So, we can set 'R1' = 112 kΩ and 'R2' = 100 kΩ .

'R1' is actually R5, 'R2' is actually R6

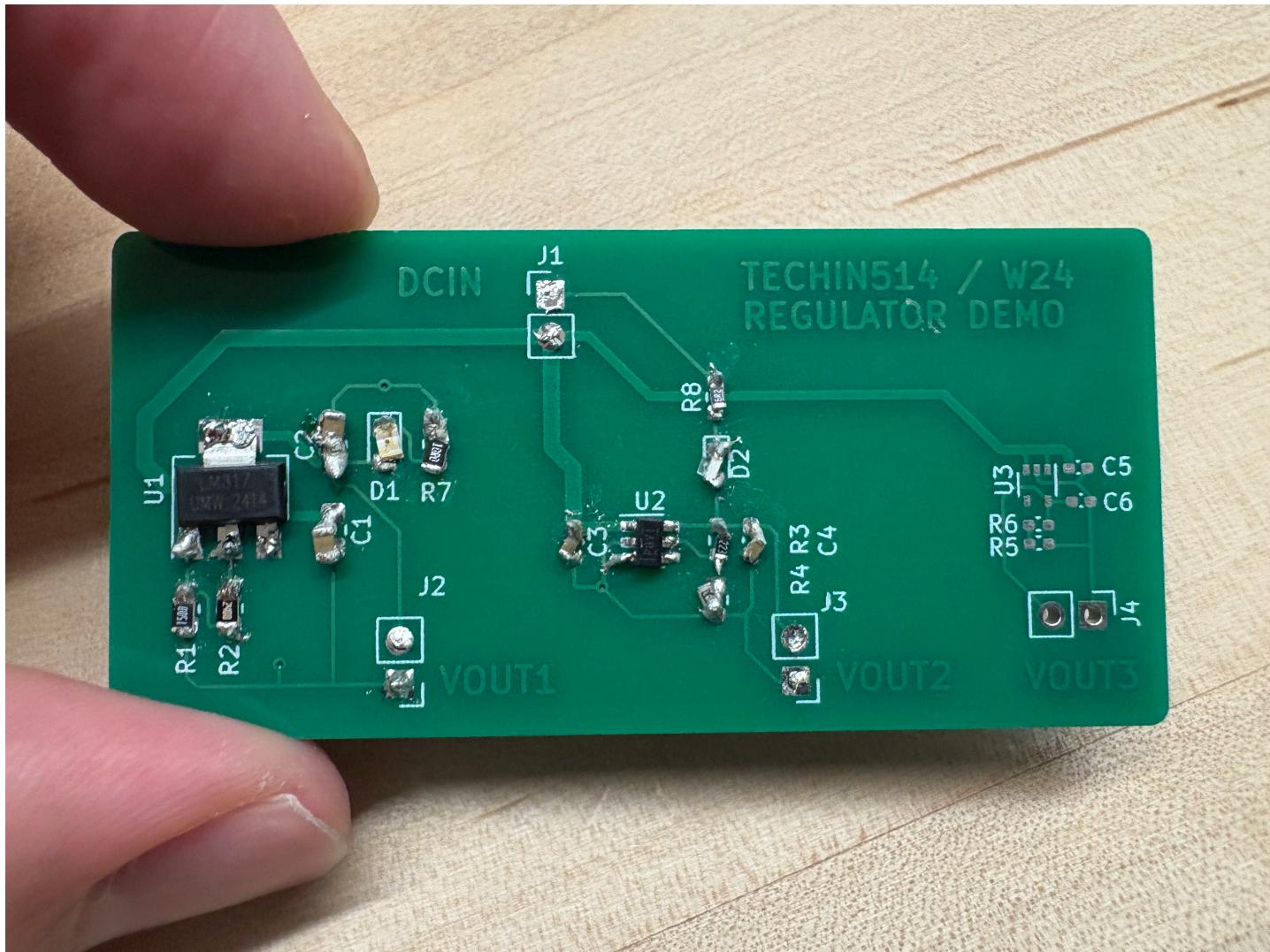
So, R5 = 112kΩ, R6 = 100kΩ

1.5 Screenshot



regulators					
#	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-C191KRKT	LED_SMD:LED_0603_1608Metric_Pad1.05x0.95mm_HandSolder	
6	J1, J2, J3, J4	4	n.m.	Connector_PinHeader_2.54mm:PinHeader_1x02_P2.54mm_Vertical	
7	R1	1	147.8Ω	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	22kΩ	Resistor_SMD:R_0603_1608Metric_Pad0.98x0.95mm_HandSolder	
10	R4	1	30.1kΩ	Resistor_SMD:R_0603_1608Metric_Pad0.98x0.95mm_HandSolder	
11	R5	1	112kΩ	Resistor_SMD:R_0402_1005Metric_Pad0.72x0.64mm_HandSolder	
12	R6	1	100kΩ	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	6Ω	Resistor_SMD:R_0603_1608Metric_Pad0.98x0.95mm_HandSolder	
15	U1	1	LM317_SOT-223	Package_TO_SOT_SMD:SOT-223-3_TabPin2	
16	U2	1	TPS79301-EP	Package_TO_SOT_SMD:SOT-23-6	
17	U3	1	MIC5377	Package_TO_SOT_SMD:SOT-353_SC-70-5	

2 Voltage Measurement Exercise



ADC Value: 2464	Voltage: 1.986 V
ADC Value: 2502	Voltage: 2.016 V
ADC Value: 2482	Voltage: 2.000 V
ADC Value: 2472	Voltage: 1.992 V
ADC Value: 2423	Voltage: 1.953 V
ADC Value: 2466	Voltage: 1.987 V
ADC Value: 2395	Voltage: 1.930 V
ADC Value: 2442	Voltage: 1.968 V
ADC Value: 2495	Voltage: 2.011 V
ADC Value: 2426	Voltage: 1.955 V
ADC Value: 2438	Voltage: 1.965 V
ADC Value: 2447	Voltage: 1.972 V
ADC Value: 2434	Voltage: 1.961 V

ADC Value: 2468	Voltage: 1.989 V
ADC Value: 2444	Voltage: 1.970 V
ADC Value: 2483	Voltage: 2.001 V
ADC Value: 2470	Voltage: 1.990 V
ADC Value: 2435	Voltage: 1.962 V
ADC Value: 2435	Voltage: 1.962 V
ADC Value: 2387	Voltage: 1.924 V
ADC Value: 2501	Voltage: 2.015 V
ADC Value: 2425	Voltage: 1.954 V
ADC Value: 2433	Voltage: 1.961 V
ADC Value: 2395	Voltage: 1.930 V
ADC Value: 2501	Voltage: 2.015 V
ADC Value: 2461	Voltage: 1.983 V
ADC Value: 2385	Voltage: 1.922 V
ADC Value: 2434	Voltage: 1.961 V
ADC Value: 2398	Voltage: 1.932 V
ADC Value: 2391	Voltage: 1.927 V
ADC Value: 2440	Voltage: 1.966 V
ADC Value: 2503	Voltage: 2.017 V
ADC Value: 2403	Voltage: 1.936 V
ADC Value: 2492	Voltage: 2.008 V
ADC Value: 2481	Voltage: 1.999 V
ADC Value: 2475	Voltage: 1.995 V
ADC Value: 2408	Voltage: 1.941 V
ADC Value: 2426	Voltage: 1.955 V

github link: <https://github.com/menglh20>HelloXiao/blob/main/lab2/readVoltage/src/main.cpp>