

# Lab2 EE Fundamentals Lab Report

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## 1 Calculation

### 1.1 VOUT

LM317 regulator VOUT1: 2.02V

TPS79301 regulator VOUT2: 2.12V

MIC5377 regulator VOUT3: 2.12V

### 1.2 LM317

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

Vref = 1.25V

Typically 'R1' is 240Ω, so 2.02V = 1.25V \* (1 + R2 / 240Ω), 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

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

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

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

(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

125%

View

Zoom

Add Category

Pivot Table

Insert

Table

Chart

Text

Shape

Media

Comment

Share

Format

Organize

Sheet 1

A

B

C

D

E

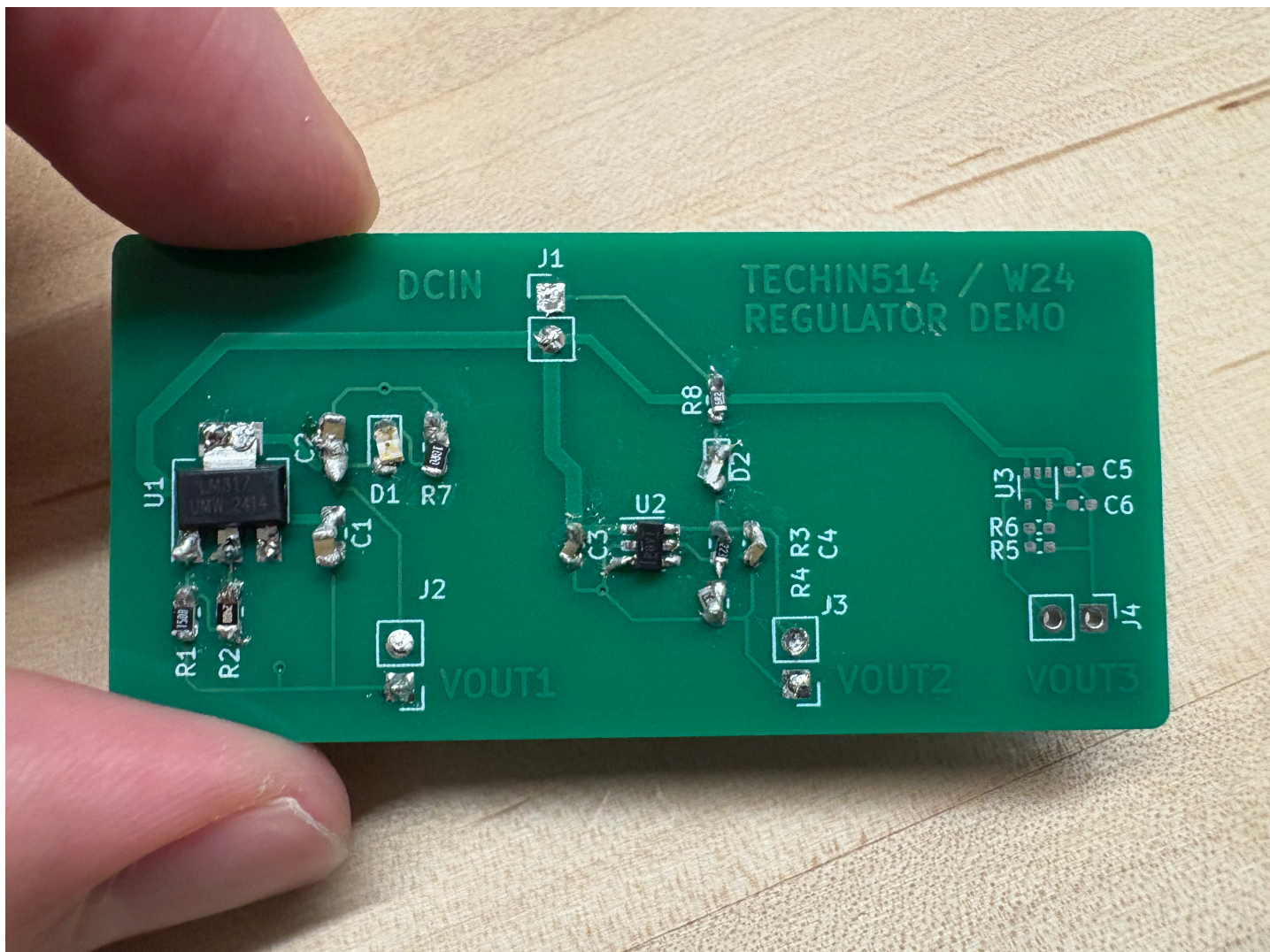
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	#	Reference	Qty	Value	Footprint	DNP
1						
2	1	C1, C2	2	1uF	Capacitor_SMD:C_0805_2012Metric_Pad1.18x1.45mm_HandSolder	
3	2	C3, C4	2	1uF	Capacitor_SMD:C_0603_1608Metric_Pad1.08x0.95mm_HandSolder	
4	3	C5, C6	2	1uF	Capacitor_SMD:C_0402_1005Metric_Pad0.74x0.62mm_HandSolder	
5	4	D1	1	LS R976	LED_SMD:LED_0805_2012Metric_Pad1.15x1.40mm_HandSolder	
6	5	D2	1	LTST-C191KRKT	LED_SMD:LED_0603_1608Metric_Pad1.05x0.95mm_HandSolder	
7	6	J1, J2, J3, J4	4	n.m.	Connector_PinHeader_2.54mm:PinHeader_1x02_P2.54mm_Vertical	
8	7	R1	1	147.8Ω	Resistor_SMD:R_0805_2012Metric_Pad1.20x1.40mm_HandSolder	
9	8	R2	1	240Ω	Resistor_SMD:R_0805_2012Metric_Pad1.20x1.40mm_HandSolder	
10	9	R3	1	22kΩ	Resistor_SMD:R_0603_1608Metric_Pad0.98x0.95mm_HandSolder	
11	10	R4	1	30.1kΩ	Resistor_SMD:R_0603_1608Metric_Pad0.98x0.95mm_HandSolder	
12	11	R5	1	112kΩ	Resistor_SMD:R_0402_1005Metric_Pad0.72x0.64mm_HandSolder	
13	12	R6	1	100kΩ	Resistor_SMD:R_0402_1005Metric_Pad0.72x0.64mm_HandSolder	
14	13	R7	1	10Ω	Resistor_SMD:R_0805_2012Metric_Pad1.20x1.40mm_HandSolder	
15	14	R8	1	6Ω	Resistor_SMD:R_0603_1608Metric_Pad0.98x0.95mm_HandSolder	
16	15	U1	1	LM317_SOT-223	Package_TO_SOT_SMD:SOT-223-3_TabPin2	
17	16	U2	1	TPS79301-EP	Package_TO_SOT_SMD:SOT-23-6	
18	17	U3	1	MIC5377	Package_TO_SOT_SMD:SOT-353_SC-70-5	

Text

6Ω

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:	<u>2447</u>	Voltage:	1.972 V
ADC Value:	2434	Voltage:	1.961 V

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