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Module 915 Summing Circuit (adding voltages)

Procedure

Build the following circuit. Use the rechargeable NiMH battery to power the LM358 Op Amp. Voltage V_1 is to be supplied by the function generator; a $1\ kHz$ square wave with $2\ V$ peak-to-peak and *no* offset voltage. Voltage V_2 is $1\ V$ DC provided by your benchtop power supply. There are portions of relevant datasheets on the back side of this paper.

Turn on the oscilloscope and press the Default Setup button. Use ***only*** the horizontal and vertical scale adjustments and the trigger menu to complete today's task to improve your skill set.

Use the oscilloscope to view voltages V_1, V_2, and V_3. Adjust the $100\ k\Omega$ potentiometer and observe how the potentiometer provides for a "weighted sum" of inputs V_1 and V_2 at the output.

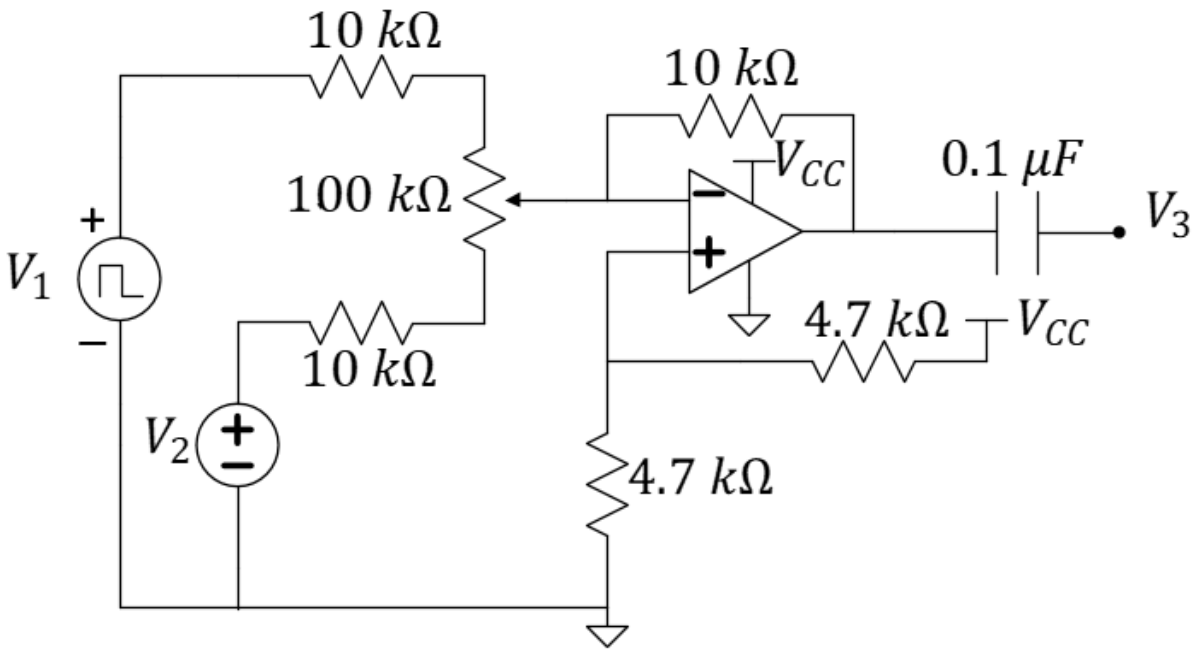


Figure 1: *Circuit to add two voltages (a weighted sum, if desired, or a DC offset).*

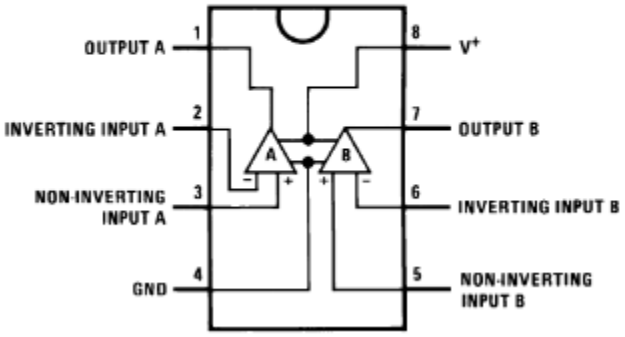
With the potentiometer turned to the two extremes, determine and record the scaling factors α_1 and α_2 where $V_3 = \alpha_1 V_1$ and $V_3 = \alpha_2 V_2$. Turn your potentiometer towards its center setting to see if you can achieve $V_3 \approx \alpha(V_1 + V_2)$, that is, the output is nearly the sum of the two inputs (to within a scaling factor). Let your TA know you are ready for evaluation to receive your module credit.

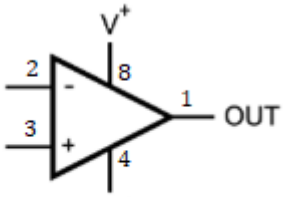
Evaluation

- Ability to map a circuit design onto the breadboard in a functional and clean manner.
- Ability to use the oscilloscope.
- Ability to troubleshoot problems that occur during a build.

LMx58-N Low-Power, Dual-Operational Amplifiers

D, P, and NAB Package
8-Pin SOIC, PDIP, and CDIP
Top View





(Left Amplifier)

6.1 Absolute Maximum Ratings

See (1)(2)(3).

			LM158, LM258, LM358, LM158A, LM258A, LM358A		LM2904		UNIT
			MIN	MAX	MIN	MAX	
Supply Voltage, V^+				32		26	V
Differential Input Voltage				32		26	V
Input Voltage			−0.3	32	−0.3	26	V
Power Dissipation(4)	PDIP (P)			830		830	mW
	TO-99 (LMC)			550			mW
	SOIC (D)			530		530	mW
	DSBGA (YPB)			435			mW
Output Short-Circuit to GND (One Amplifier)(5)	$V^+ \le 15$ V and $T_A = 25°C$			Continuous		Continuous	
Input Current ($V_{IN} < -0.3V$)(6)				50		50	mA
Temperature			−55	125			°C
	PDIP Package (P): Soldering (10 seconds)			260		260	°C
	SOIC Package (D)	Vapor Phase (60 seconds)		215		215	°C
		Infrared (15 seconds)		220		220	°C
Lead Temperature	PDIP (P): (Soldering, 10 seconds)			260		260	°C
	TO-99 (LMC): (Soldering, 10 seconds)			300		300	°C
Storage temperature, T_{stg}			−65	150	−65	150	°C