C5

Working with ICs: the 555 Timer

CHAPTER ASSIGNMENT

Name _____ Class _____ No. _____ Date _____

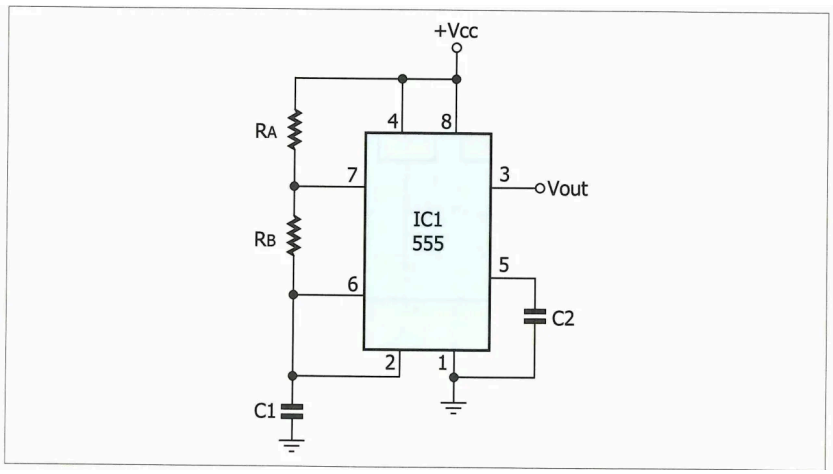
Answer every question in the space given. Show your working. You may use the chapter page to help you.

Questions from the Guru Jazzy chapter page, for classroom use.

Try it

1 Try it: 555 calculator

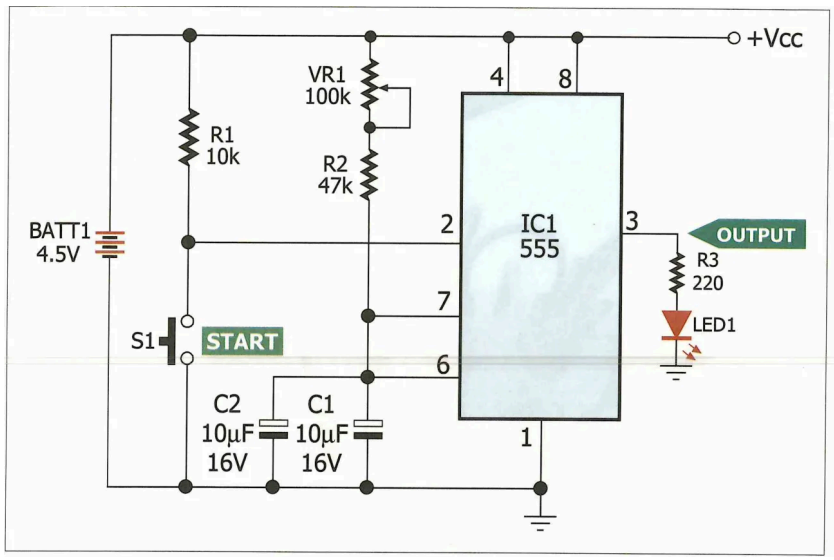
Astable uses RA, RB and C; monostable uses RA as R1 and C.



Labs

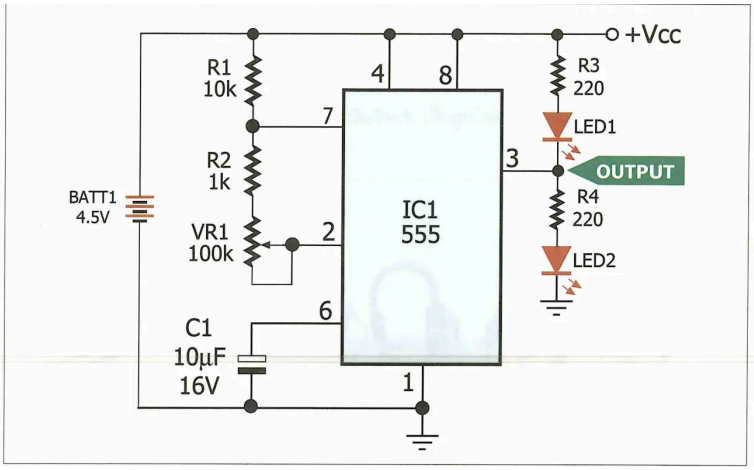
5.1 Time it

1. Simulate Project 9 in Tinkercad. Turn VR1 to one end, press START and time how long LED1 stays on.
2. Turn VR1 to the other end and time it again. Compare with Tmin ≈ 1 s and Tmax ≈ 3.2 s.
3. Remove C2 (leaving 10 µF). Predict the new times, then measure.

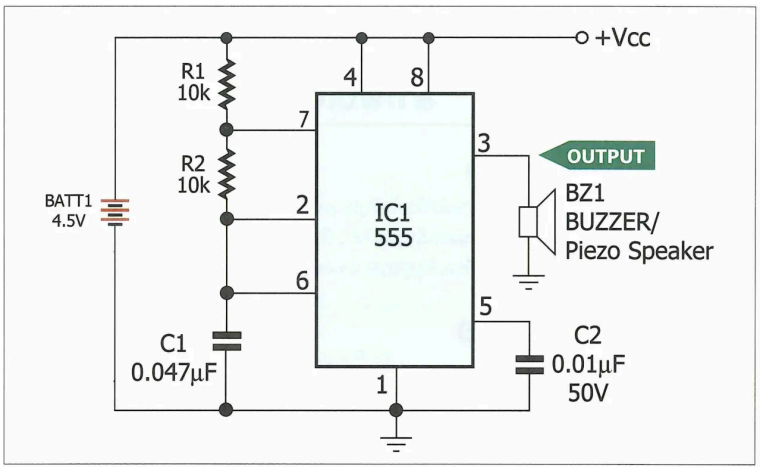


Activity: Work it out, then test it

1 Project 7 with C1 changed to 4.7 µF: what are the slowest and fastest blink rates?



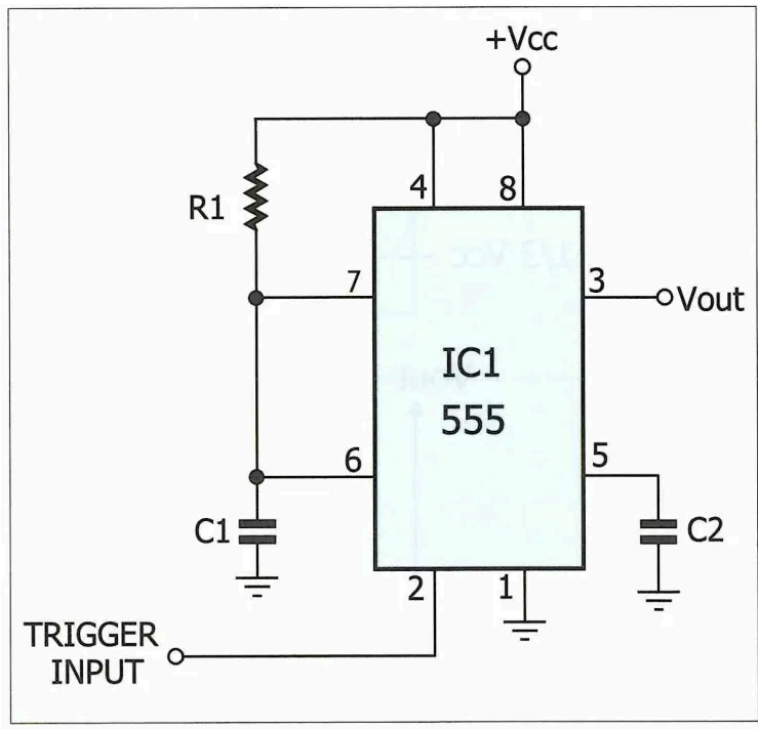
2 Project 8: choose a new C1 so the tone is about 500 Hz. Simulate it — does it sound lower?



3 Project 8: which C1 gives about 2 kHz?

4 Project 9: which R2 would make the shortest delay 2 s with the same 20 µF?

5 A monostable with R1 = 100 kΩ and C1 = 10 µF: how long is the pulse?



Chapter quiz

1 On a DIP IC, how do you find pin 1?

A	B	C	D
It is always the pin nearest the label	Next to the notch or dot; then count anticlockwise seen from the top	It is the middle pin on the right	Pin 1 is always the longest pin

2 At what fractions of Vcc do the 555's two comparators switch?

A. 1/2 and 1/4 B. 2/3 and 1/3 C. 1/10 and 9/10 D. 0.7 V and 4.5 V

3 Which 555 pin is the output?

A. Pin 1 B. Pin 2 C. Pin 3 D. Pin 8

4 Why does a basic 555 astable always have a duty cycle above 50%?

A	B	C	D
Because the output is inverted	C1 charges through RA and RB but discharges only through RB	Because pin 5 has a capacitor	Because Vcc is 4.5 V

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5 A 555 monostable has R1 = 10 kΩ and C1 = 0.01 µF. How long is its output pulse?

A. 0.11 ms B. 1.1 ms C. 11 ms D. 0.11 s

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6 In Project 7, what happens to the blink rate as you turn VR1 up to 100 kΩ?

A	B	C	D
It speeds up to 12 Hz	It slows down to about 0.68 Hz	It stays the same	The LEDs stay on

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7 In Project 8, why is the frequency set to about 1 kHz?

A	B	C	D
The piezo only works at exactly 1 kHz	It is a clear tone in the range people hear well; above about 10 kHz it becomes too high to hear	The 555 cannot go above 1 kHz	To save the battery

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8 In Project 9, why are two 10 µF capacitors placed in parallel?

A	B	C	D
To make 5 µF	To make 20 µF and a longer delay	To block DC	To protect the LED

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9 How many pins does the UM66 melody IC have?

A. 3 B. 8 C. 14 D. 16

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10 Why does Project 11 add a BC547 transistor to the melody circuit?

A	B	C	D
To make it simulate in Tinkercad	To amplify the signal so the piezo is louder	To change the song	To reduce the supply to 3 V

End of assignment · Check your answers against the chapter at gurujazzy.com/subjects/tinkercad/chapter-5-ic-555/