555 Timer Sound Synthesizer

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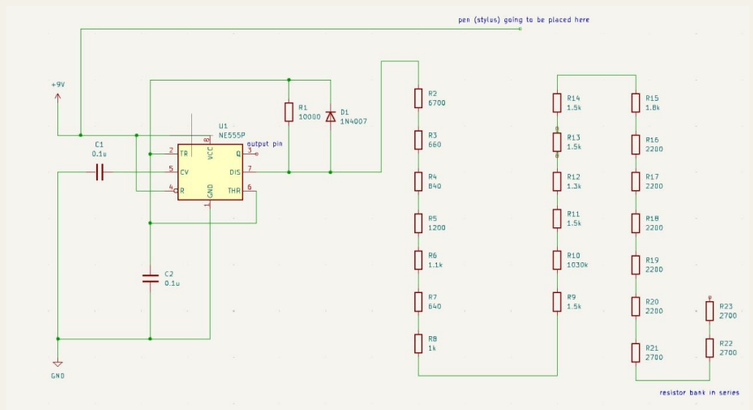
PROBLEM STATEMENT

Design a 555 timer-based sound synthesizer capable of generating 22 distinct tones.The circuit should provide stable frequency outputs.It should be able to drive a small speaker and maintain consistent sound quality. The design should be simple, cost-effective, and suitable for basic musical applications.

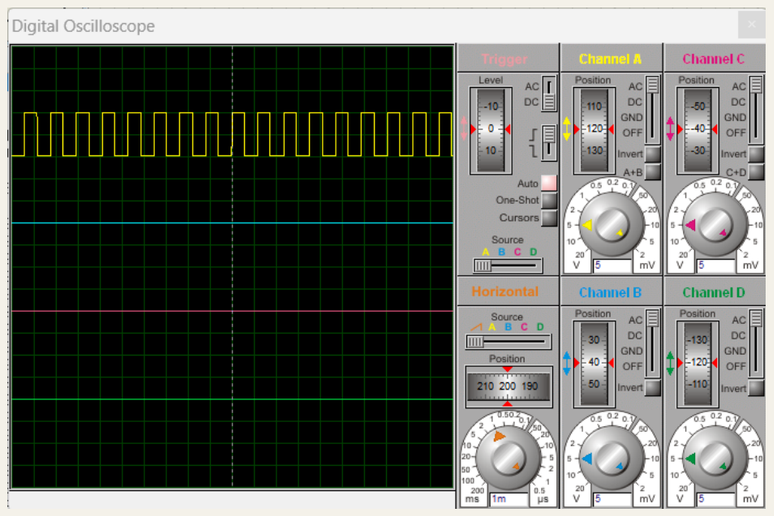
APPROACH / DESIGN/ METHODOLOGY

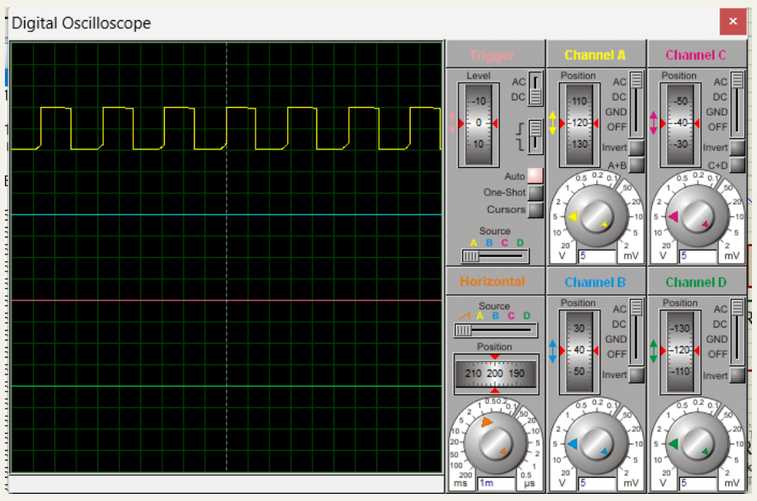
The 555 timer is set in astable mode to continuously oscillate and generate a square wave signal.22 resistors are used to set different resistance values, allowing the circuit to produce 22 distinct tones. The square wave output from pin 3 of the 555 timer is fed to an 8Ω speaker, producing audible tones.

CIRCUIT DIAGRAM /ALGORITHM

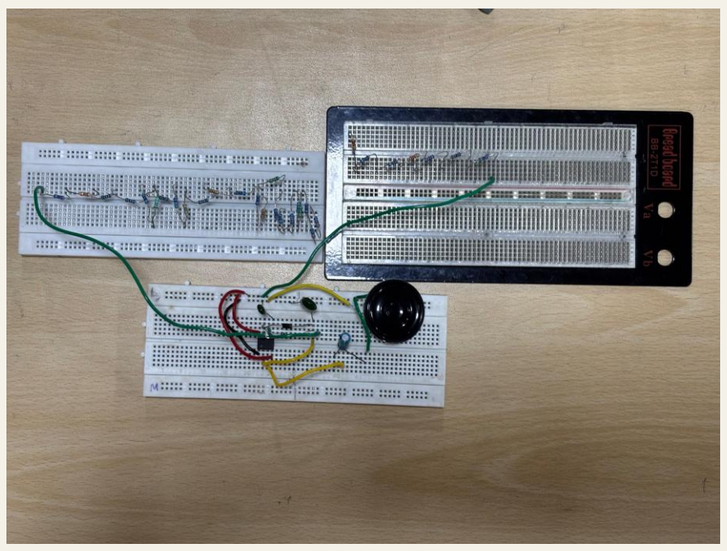


SIMULATION RESULTS

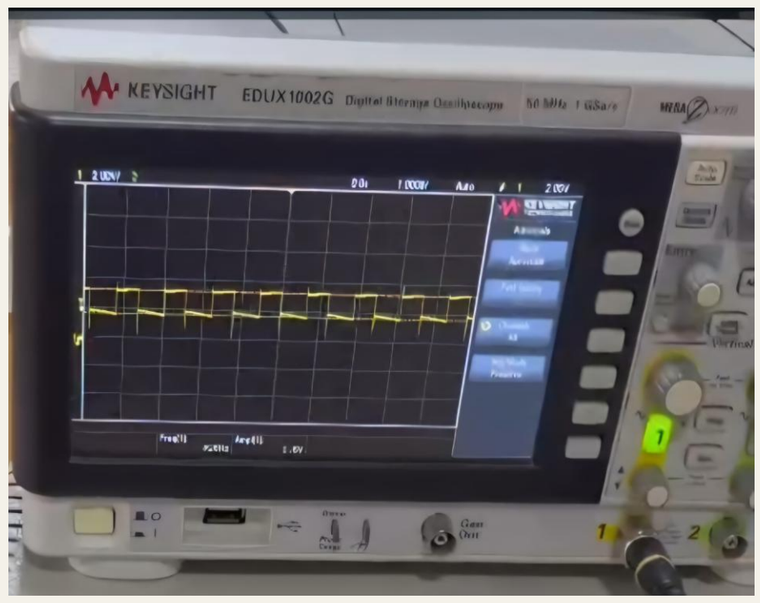




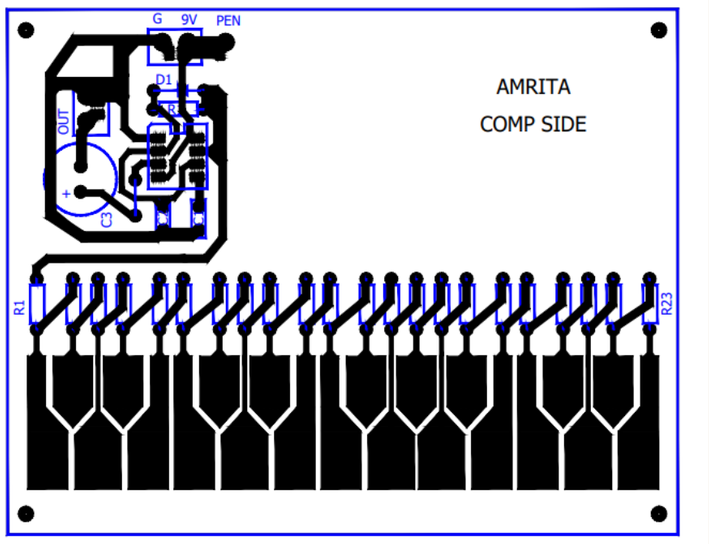
WORKING MODEL PICTURES



RESULTS/ CALIBRATION/ ERROR GRAPH



PCB LAYOUT



REFERENCES

[1] A. Sedra and K. Smith, *Microelectronic Circuits*. S.L.: Oxford Univ Press Us, 2019.

[2] Kristijan Nelkovski, “Create Your Own Stylus-Controlled Synthesizer,” *Allaboutcircuits.com*, Dec. 08, 2024. https://www.allaboutcircuits.com/projects/create-your-own-stylus-controlled-synthesizer/ (accessed Mar. 27, 2025).

[3] drj113, “A Stylophone,” *Instructables*. https://www.instructables.com/A-Stylophone/