

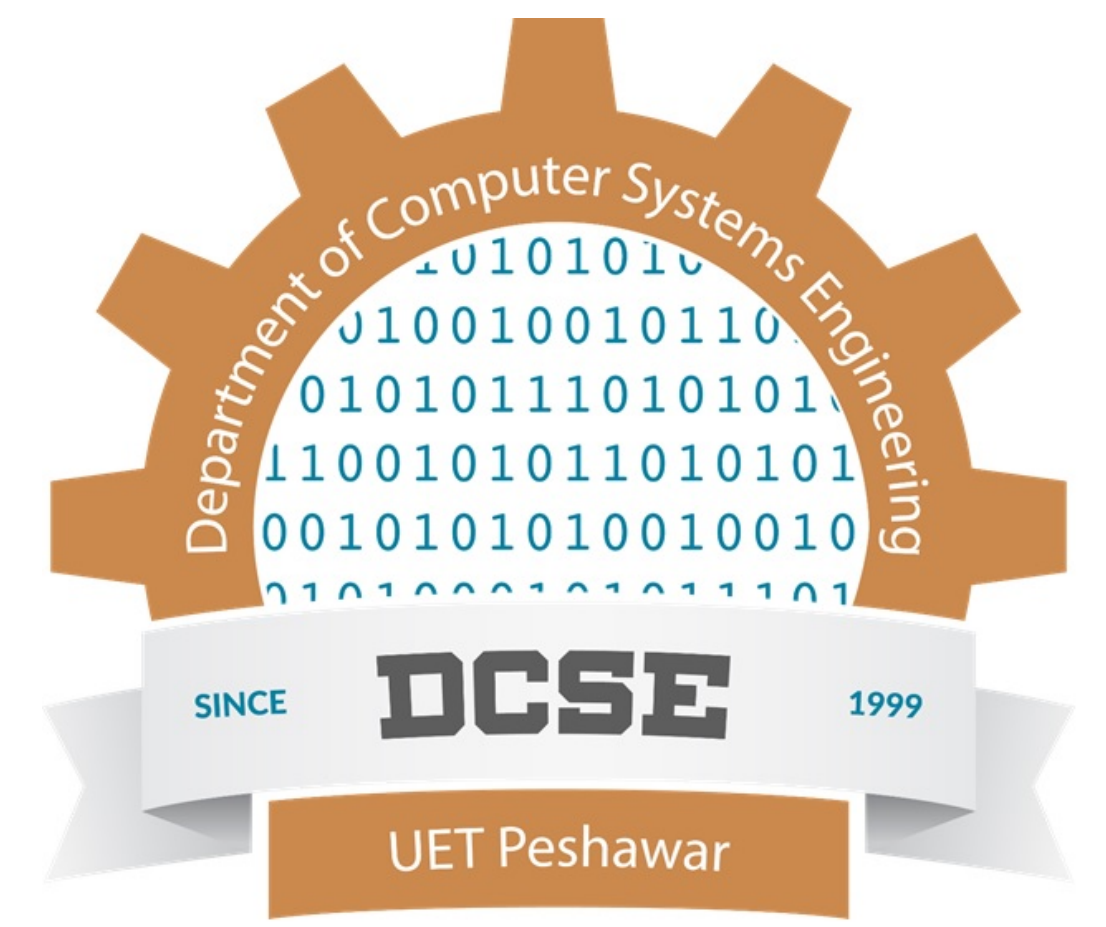
Music-Reactive RGB LEDs Circuit

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Introduction

Introduction of the project

- A music-reactive RGB LED circuit combines RGB LEDs and audio input to create captivating light displays that synchronize with music.
- The LEDs respond to sound levels and frequencies, producing dynamic lighting effects.

Motivation

1: Party or Event Lighting:

- Create an exciting atmosphere by synchronizing the LED lights with music at parties, concerts, or events. The dynamic lighting effects will enhance the overall experience and engage the audience.

2: Home Entertainment:

- Set up the circuit in your home entertainment area to elevate your movie-watching or gaming sessions. The LEDs will respond to the audio, adding a visual dimension and immersing you in the on-screen action.

3: Mood Lighting:

- Use the circuit as mood lighting in your living space or bedroom. The LED lights can change color and intensity based on the music you play, creating a relaxing or energizing ambiance according to your preference.

4: Visual Performances:

- Artists, DJs, and performers can incorporate the music-reactive LED circuit into their live performances. The synchronized lighting effects will captivate the audience and add a visual element to the music.

5: Educational Demonstration:

- The circuit can be utilized in educational settings to teach the principles of sound, electronics, and lighting. Students can learn about signal processing, amplification, and the interplay between audio and visual elements.

Circuit Schematic

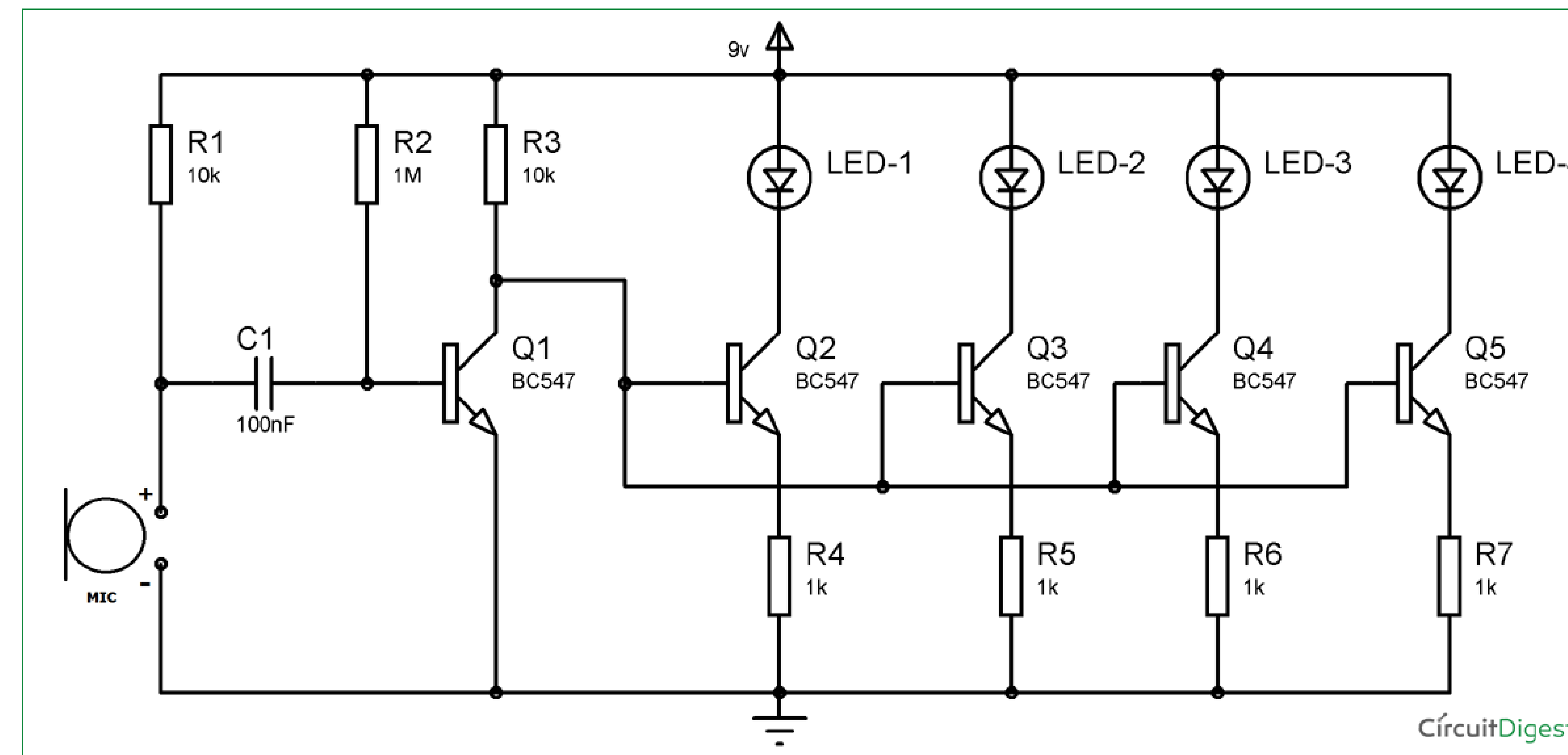


Figure: Schematic diagram

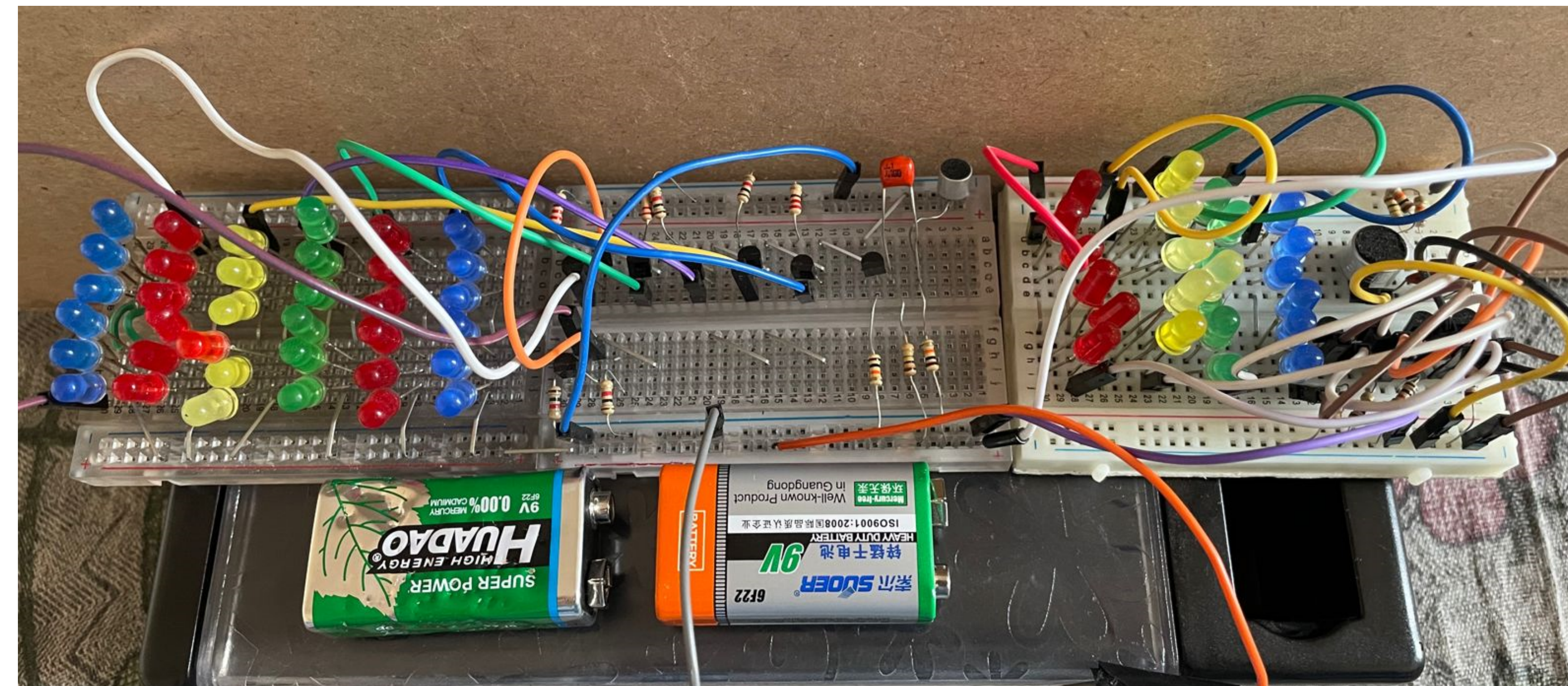


Figure: visual representation

Operating Procedure

Step 1: Sound Input:

- A condenser microphone captures sound signals and converts them into voltage levels.
- The microphone acts as a sensor that captures the surrounding sound
- The microphone converts sound signals into varying voltage levels.
- **how Mic convert sound signal into voltage levels?**
 - The microphone consists of a diaphragm and a transducer.
 - Sound waves cause the diaphragm to vibrate, changing the capacitance of the transducer.
 - The changing capacitance generates an electrical signal that represents the sound.
 - The electrical signal from the microphone is in the form of varying voltage levels corresponding to the sound waves.

Step 2: Noise Filtering:

- A high-pass filter (resistor and capacitor) eliminates unwanted noise from the sound signals.
- This filter allows higher frequency components associated with the music or sound to pass through while blocking lower frequency noise.

Step 3: Signal Amplification:

- An NPN transistor amplifies the filtered signals.
- The transistor acts as an amplifier, boosting the strength of the signals for further processing.

Step 4: LEDs Activation:

- The amplified signals are fed into an array of transistors.
- Each transistor in the array acts as an amplifier as well.
- When the amplified signals pass through the transistors, they trigger the corresponding LEDs to light up.
- Each transistor in the array works as an amplifier, causing the LEDs to glow based on the sound pattern.
- Additional LEDs can be added with transistors to enhance the visual effect.
- Based on the analyzed data, the intensity or color of the RGB LEDs changes, creating synchronized lighting effects