

Circuit Design & Working

3. Component Specification

3.2.1 RP2040 Raspberry pi pico pin configuration.

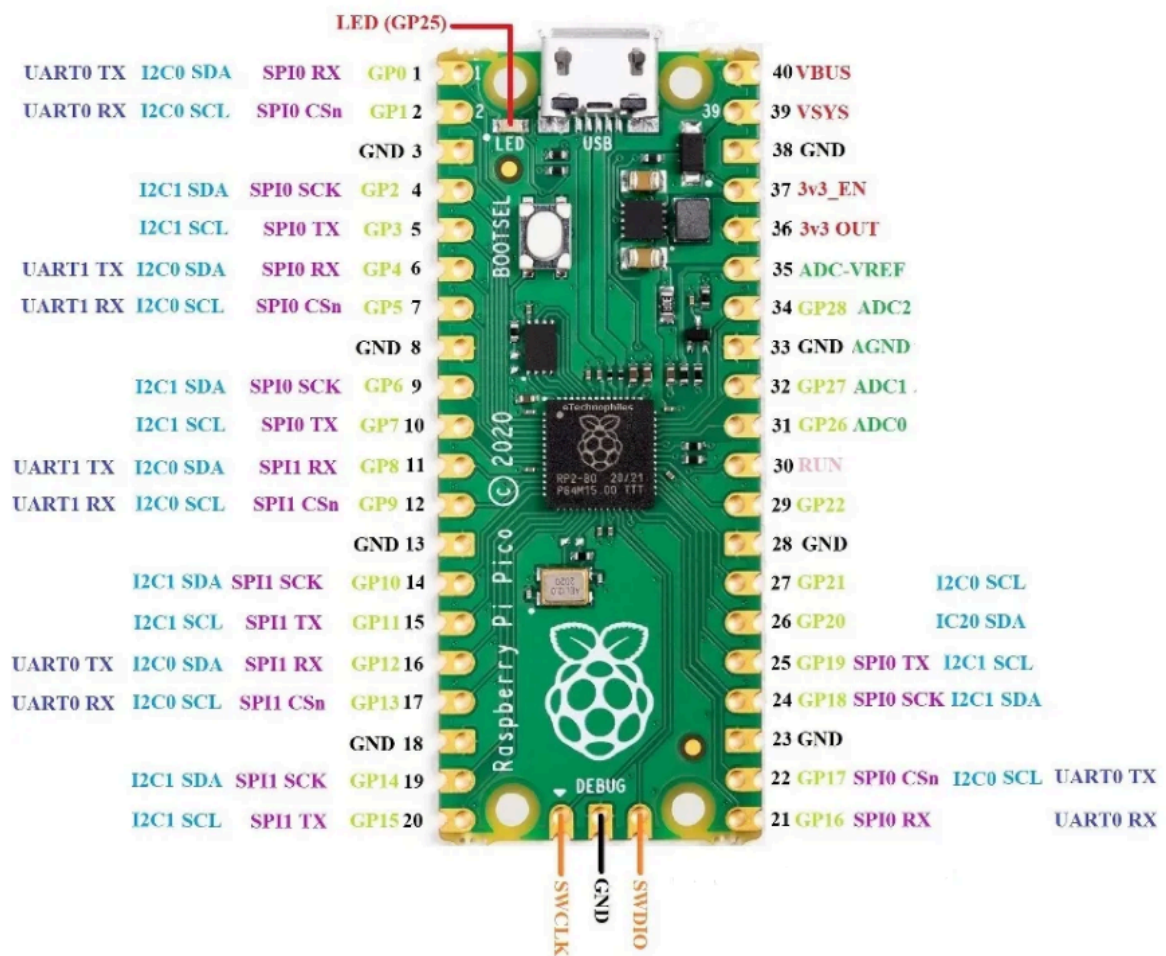


Fig 3.2.1

Raspberry Pi Pico is a **low-cost, high-performance microcontroller board with flexible digital interfaces**. Key features include: RP2040 microcontroller chip designed by Raspberry Pi in the United Kingdom. Dual-core Arm Cortex M0+ processor, flexible clock running up to 133 MHz. compiler toolchains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project.

RP2040 Raspberry pi pico specifications:

- 21 mm × 51 mm form factor
- RP2040 microcontroller chip designed by Raspberry Pi in the UK
- Dual-core Arm Cortex-M0+ processor, flexible clock running up to 133 MHz
- 264KB on-chip SRAM
- 2MB on-board QSPI Flash
- 26 multifunction GPIO pins, including 3 analogue inputs
- 2 × UART, 2 × SPI controllers, 2 × I2C controllers, 16 × PWM channels
- 1 × USB 1.1 controller and PHY, with host and device support
- 8 × Programmable I/O (PIO) state machines for custom peripheral support
- Supported input power 1.8–5.5V DC
- Operating temperature -20°C to +85°C

.2.3 LM398 Sound - Detector sensor



Fig 3.2.3

The sound sensor is one type of module used to notice the sound. Generally, this module is used to detect the intensity of sound. The applications of this module mainly include switch, security, as well as Monitoring. The accuracy of this sensor can be changed for the ease of usage.

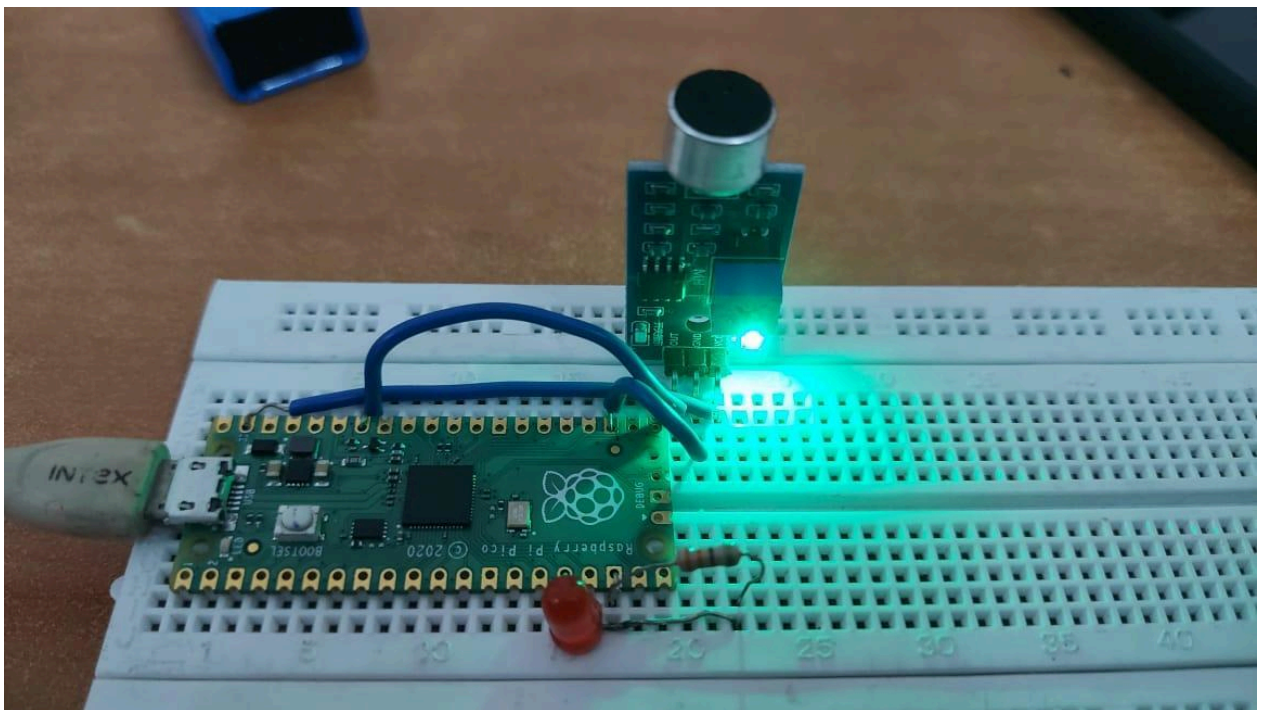
Audio Detector Sensor Pin Configuration:

- Pin1 (VCC): 3.3V DC to 5V DC
- Pin2 (GND): This is a ground pin
- Pin3 (DO): This is an output pin

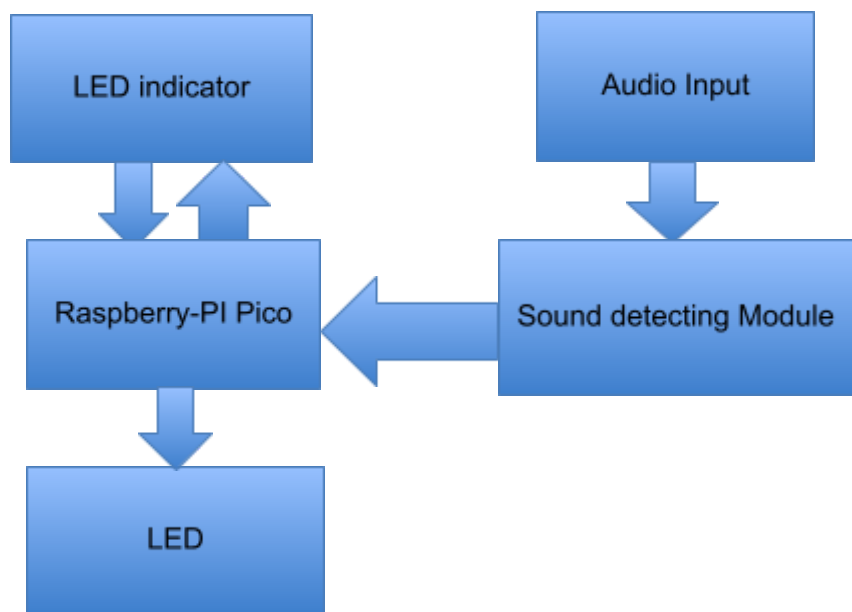
Audio Detector Sensor Specifications :

- The range of operating voltage is $3.3\frac{3}{5}$ V
- The operating current is 4~5 mA
- The voltage gain 26 dB ($V=6V$, $f=1kHz$)
- The sensitivity of the microphone (1kHz) is 52 to 48 dB
- The impedance of the microphone is 2.2k Ohm
- The frequency of the microphone is 16 to 20 kHz
- The signal to noise ratio is 54 dB

3.4 Circuit Diagram



3.4 Block Diagram



BLOCK DIAGRAM (3.4.a)

Result & Analysis

LEDs are as of now the most vitality proficient source having significantly less vitality utilization (power) than radiant, fluorescent, metal halide or mercury lights, inside the glowing effectiveness of 80-90%. This implies 80% of the vitality provided to the gadget is changed over to light, while 20% is lost and changed over into heat.

It tends to be utilized in party halls, restaurants, home decor, gaming setup, and many more.

These neat gadgets add a splash of color and light anywhere you have sound. Each one of these LED light can respond with colorful light show using a microphone and can be set to different color schemes.

This sound-activated light is designed to change its LEDs' color on sounds

picked up by an internal microphone. The result is a light that reacts to the sounds around it, keeping up with, say, the bass beats of a DJ's set.

5.1 Conclusion

It can be concluded from the above discussion that Audio reactive Led lights or Beat sensing lights are a special kind of lights which dances on the intensity of loudness.

Since these are LED , you can mount them almost anywhere by peeling off the 3M tape at the back. So whether you use it as a sofa light or an ambient light on your TV, this thing will spread it's awesomeness everywhere.

5.2 Reference

1. Wikipedia
2. Sound Activated LED matrix 2021
3. Easy Programming Audio Activated LEDs 2020
4. An inexpensive Arduino-based LED stimulator system for vision research November 2012