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Software

Integrating LM393 Sound Detection Sensor with Arduino Uno

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1 INTRODUCTION

This documentation details the integration of the LM393 sound detection sensor with an Arduino Uno board to capture the intensity of sound. The LM393 sensor provides analog output signals corresponding to the detected sound levels. In this project, the Arduino Uno reads the analog signal from the sensor and determines if it exceeds a predefined threshold. If the sound intensity surpasses the threshold, the state of an LED is switched: if it's on, it turns off, and if it's off, it turns on. This document includes instructions on connecting the LM393 sensor to the Arduino Uno, programming the Arduino to read sound data, and controlling the LED based on sound intensity.

2 COMPONENTS USED

2.1 Hardware Components:

2.1.1 Arduino Uno:

- Includes 14 digital pins and 6 analog pins.
- Operates at a voltage of 5V.
- Microcontroller: ATmega328P
- Uses the ATmega328P microcontroller.
- Runs at a clock speed of 16MHz.

2.1.2 LED:

- Light-emitting diodes.
- Typically operate at a voltage of around 2-3 volts.
- Require

2.1.3 LM393 Sound Detection Sensor:

- The LM393 Sound Detection Sensor module typically includes four pins: A (Analog Output), G (Ground), + (Power), and D0 (Digital Output).
- It utilizes an LM393 dual comparator chip to detect sound intensity and outputs analog signals proportional to the detected sound levels.
- Operating Voltage: The LM393 Sound Detection Sensor module typically operates within a voltage range of 3.3V to 5V, ensuring compatibility with various microcontroller boards, including the Arduino Uno.
- The module features a potentiometer for adjusting the sensitivity threshold of sound detection.

2.1.4 Resistor:

- 330 Ohm resistors.
- Used for current limiting with LEDs.

2.2 Software Components:

2.2.1 Arduino IDE:

- Integrated Development Environment (IDE) for Arduino boards.
- Provides a user-friendly interface for writing, compiling, and uploading code to the Arduino Uno.
- Offers a wide range of built-in functions and libraries for interfacing with hardware components.

3 HARDWARE CONNECTIONS SETUP

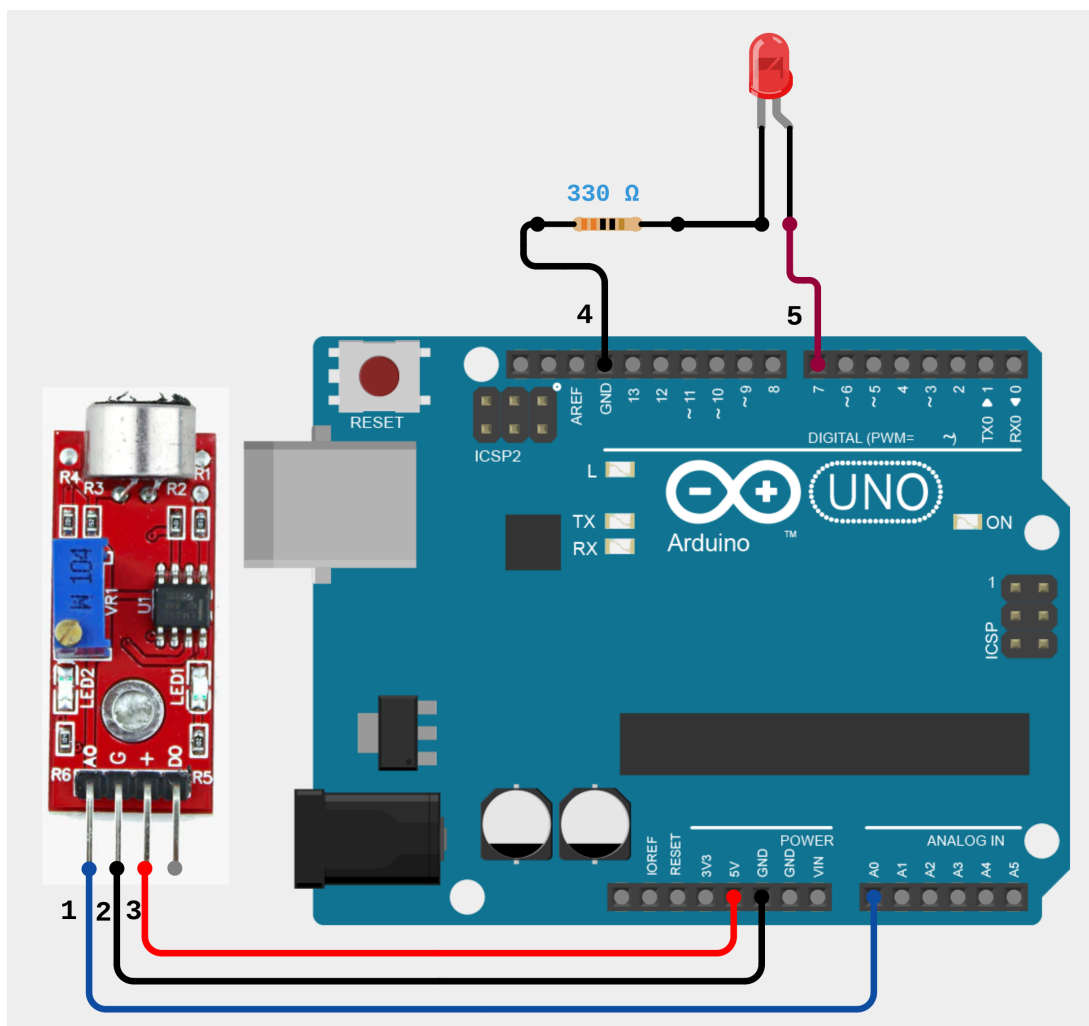


Figure 2: Hardware Connections Setup Circuit Diagram

1. Connect pin A of the LM393 Sound Detection Sensor to analog pin A0 on the Arduino Uno.

2. Connect pin G of the LM393 Sound Detection Sensor to the ground (GND) pin on the Arduino Uno.
3. Connect pin + of the LM393 Sound Detection Sensor to the 5V pin on the Arduino Uno.
4. Connect the negative (-) terminal of the LED to the ground (GND) pin on the Arduino Uno through a 330-ohm resistor.
5. Connect the positive (+) terminal of the LED to the 7th digital pin on the Arduino Uno.

4 RESULT

The LM393 Sound Detection Sensor offers analog output signals proportional to the detected sound levels. In this setup, the Arduino Uno interprets the analog signal from the sensor. If the sound intensity surpasses a predefined threshold, the LED's state toggles: if it's on, it turns off, and if it's off, it turns on. This process ensures that the LED reflects changes in sound intensity above the threshold level.