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Software

Integrating Reed Switch with Arduino using Interrupt

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1 INTRODUCTION

This setup illustrates the integration of a reed switch with an Arduino board using interrupt functionality. A reed switch, a magnetic sensor, alters its state when exposed to a magnetic field. Connected to the Arduino with a pull-up resistor, the reed switch transitions from LOW to HIGH when a magnetic field is detected, triggering an interrupt. This transition controls the LED state, turning it on when the magnetic field is present and off when it's absent.

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 Reed Switch:

- Default Closed State: The reed switch is normally closed, enabling current flow through the circuit in its default state.
- Magnetic Field Sensing: When a magnetic field is introduced near the reed switch, it opens, interrupting the circuit and preventing current flow.
- Triggering Mechanism: The transition from a closed to an open state occurs in response to the presence of a magnetic field, allowing the reed switch to function as a magnetic sensor.

2.1.3 LED:

- Light-emitting diodes.
- Typically operate at a voltage of around 2-3 volts.
- Require a current-limiting resistor to prevent damage.

2.1.4 Resistors:

- 330 Ohm resistors.
- Used for current limiting with LED.
- 10k Ohm pull-up resistors.
- Ensure stable signal reading with reed switch.

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

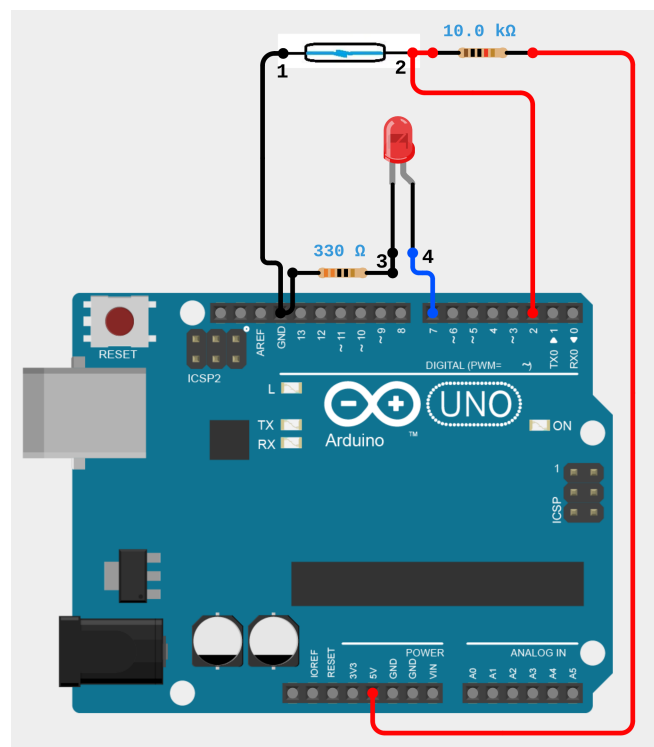


Figure 2: Hardware Connections Setup Circuit Diagram

1. Connect one terminal of the reed switch to the ground (GND) of the Arduino Uno.
2. Connect the other terminal of the reed switch to digital pin 2 (interrupt 0) of the Arduino Uno. Additionally, connect this pin to +5V of the Arduino Uno through a 10K ohm resistor.
3. Connect the negative (-) terminal of the LED to the ground (GND) of the Arduino Uno through a 330 Ohm resistor.
4. Connect the positive (+) terminal of the LED to the 7th digital pin of the Arduino Uno.

4 RESULT

The implemented circuit utilizing the reed switch and LED demonstrated the expected behavior using interrupts. When a magnetic field approached and triggered the reed switch to change its state from closed to open, the LED turned on. Conversely, when the magnetic field was removed and the reed switch returned to its closed state, the LED turned off. This behavior persisted reliably, demonstrating the successful integration of the reed switch with the Arduino Uno for magnetic field detection.