CAD_Phase_3

COMPONENTS USED:

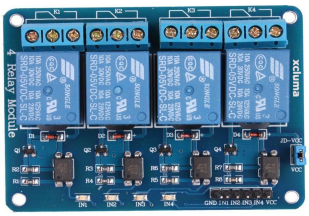
Arduino UNO:

The Arduino UNO serves as the central processing unit, controlling and coordinating the functions of other components. It's a microcontroller board that runs the Arduino software.

The Arduino UNO is widely used in IoT projects due to its simplicity and versatility. It can be programmed using the Arduino IDE, making it accessible for both beginners and experienced developers. The presence of digital and analog pins allows for a variety of sensor and actuator connections.

Use Cases:
Home Automation: Control lights, fans, and appliances.
Data Logger: Monitor and log sensor data over time.
Robotics: Control the movement of robots.

4Relay Module:



Relay modules act as an interface between the low-voltage Arduino and high-voltage devices. They are crucial for controlling appliances securely. Understanding the power requirements of connected devices and ensuring proper isolation are important considerations when using relay modules.

Use Cases:

Home Automation: Control high-voltage devices like lights or heaters.
Smart Switching: Turn on/off appliances remotely.
Industrial Automation: Control machinery or equipment.

LCD Display:

LCD displays come in different types, such as character LCDs or graphical LCDs. The choice depends on the project requirements. The display not only provides real-time information but also enhances user interaction. Custom characters and graphics can be displayed for a more intuitive user interface

Use Cases:
Weather Station: Display temperature, humidity, and weather conditions.
Smart Home Interface: Show real-time status and alerts.
Parameter Monitoring: Display critical data such as voltage or current.

Ultra sonic sensor:

Ultrasonic sensors are crucial for applications like smart parking systems, security systems, or robotics. They work based on the echo of ultrasonic waves, making them suitable for distance measurement. Calibration and accurate placement are essential for reliable readings.

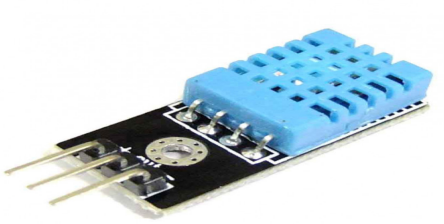
Use Cases:
Parking Assist: Measure distance for parking assistance.
Security Systems: Detect intruders or unauthorized movement.
Robotics: Implement obstacle avoidance in robots.

Servo Motor:

Servo motors are commonly employed in projects that require precise control of angular position. They have limited range compared to continuous rotation motors but offer accuracy. Controlling servo motors involves sending PWM (Pulse Width Modulation) signals to set the desired angle.

Use Cases:
Robotic Arm: Control the movement of a robotic arm.
Camera Gimbal: Stabilize and control the orientation of a camera.
Smart Door Lock: Actuate the locking mechanism.

DHT11 Temperature and humidity Sensor:

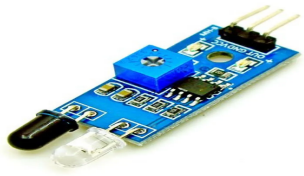


This provides accurate temperature readings and is often used in climate monitoring systems, weather stations, or home automation projects. Calibration may be necessary for precise temperature measurements, and the analog output can be converted to Celsius or Fahrenheit.

Use Cases:

Climate Monitoring: Monitor temperature in a greenhouse or room.
HVAC Systems: Control heating, ventilation, and air conditioning.
Health Monitoring: Measure body temperature for medical applications.

IR Proximity Detection Sensor:

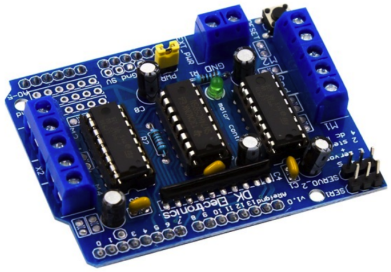


Infrared (IR) sensors for proximity detection use infrared light to detect the presence or absence of an object within their sensing range. These sensors typically consist of an infrared emitter and a receiver. When an object is within the sensor's range, it reflects the emitted infrared light back to the sensor, triggering a response.

Use Cases:
Automatic Doors: IR sensors detect the presence of individuals, enabling doors to open automatically in public spaces like supermarkets.

Robot Obstacle Avoidance: Used in robotics for obstacle avoidance, IR sensors help robots navigate and change direction in response to detected obstacles.

Electronics Motor Shield:

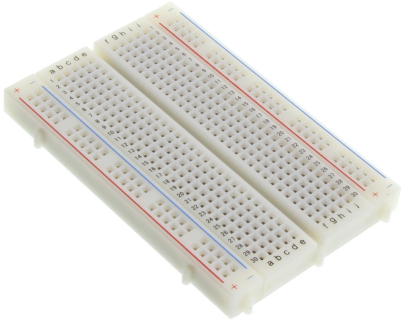


An electronic motor shield, such as the Arduino Motor Shield, is a module designed to simplify the control of motors using microcontrollers like Arduino. It provides a convenient way to drive motors, including DC motors and stepper motors, by offering features like current sensing, PWM (Pulse Width Modulation) control, and motor direction control. This shield is commonly used in robotics, automation, and mechatronics projects to efficiently control various types of motors with an Arduino board.

Use Cases:
Robotics Control: An electronic motor shield facilitates precise control of motors in robotics, enabling tasks like movement and manipulation with an Arduino.

Automated Systems: Used in automated systems and projects, the motor shield simplifies the control of motors, making it ideal for applications such as conveyor belts or smart appliances.

BreadBoard:



A breadboard is a versatile prototyping tool in electronics, providing a platform for quickly building and testing electronic circuits without soldering. It consists of a grid of interconnected metal strips and holes, allowing components like resistors, capacitors, and integrated circuits to be easily plugged in and interconnected, making it ideal for rapid experimentation and design in electronics projects.

Use Cases:

Prototyping Circuits: Breadboards are essential for rapid prototyping of electronic circuits, allowing engineers and hobbyists to experiment with components and designs without soldering.

Educational Tool: Widely used in electronics education, breadboards help students learn circuitry concepts and construct circuits for hands-on experimentation and understanding.