DESCRIPTION

The Kimat – LDR module is a simplified light sensor module with analog output voltage. It uses a light dependent resistor as sensing element. A user adjustable potentiometer is provided for sensitivity adjustment and possibly for simulation of a digital output. The module includes a power indicator LED and breadboard- friendly pin headers. The Kimat – LDR is part of Layad Circuits' Kimat series of rapid prototyping products.

Figure 1: The Kimat – LDR module

FEATURES

- Light sensing with LDR
- Sensitivity Adjustment
- 3.3V or 5V compatible
- Breadboard-friendly 2.54mm pin headers
- Power indicator LED
- Compact form factor. Board dimensions: 24x16mm.

PIN FUNCTIONS

Pin Label	Function/Operation/Remarks
VCC	Power supply pin for the module. Works with 3.3V or 5V host controllers
VO	Analog output pin. Voltage at this pin changes with light intensity.
GND	Ground pin.

SCHEMATIC

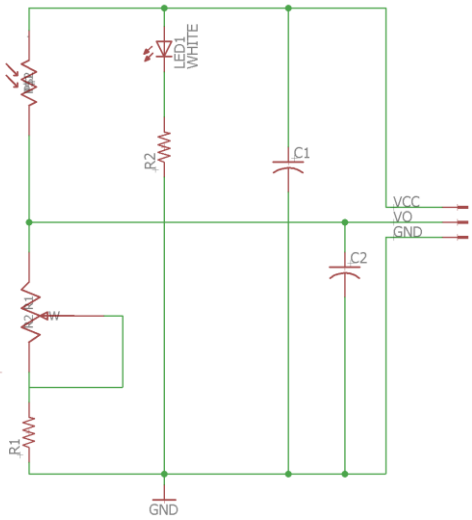

Figure 12: Schematic Diagram

APPLICATION NOTES

The Kimat-LDR module converts light falling on its light sensitive element into a voltage that varies somewhere between ground and Vcc. This is meant to be hooked up to an ADC input of a microcontroller or a dedicated ADC circuit. The output is uncalibrated and non-linear, hence testing with actual lighting conditions is recommended. This humble module has several applications. It may be used as an ambient light sensor or when coupled with directional light source such as lasers, may be used as beam-cut sensor for object/people detection or even as a speed meter.

Wiring

The Kimat – LDR follows a straightforward connection with an Arduino. Connect the Vcc and Gnd to 5V and Gnd pins of the Arduino respectively. The output VO maybe connected to any analog input pin.

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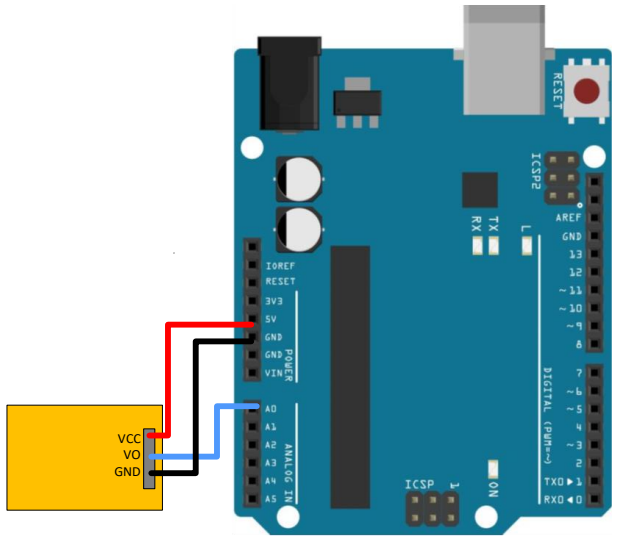

Figure 3: Connecting to an Arduino

Basic Arduino Sketch

The test sketch that follows takes the value returned by the ADC at pin A0 and display this on the serial monitor. Changing light intensity over the sensor will have a corresponding change in the reading.

```
unsigned int sensorValue;

void setup() {
  Serial.begin(9600);
}

void loop() {
  sensorValue = analogRead(A0);
  Serial.println(sensorValue);
  delay(100);
}
```

Object Counter

The next sketch that follows demonstrates a very simply method to count objects with this sensor. Any light source such as a bright window, an LED or laser is placed in front of the sensor at a distance, such that any passing object blocks the light source thereby changing the sensor reading. The sketch uses a threshold where the actual sensor reading is compared to. A reading lower or equal to the threshold indicate an object. The next count shall only proceed if the threshold returns to initial value and then breaching the threshold once more. The count is updated on the Serial Monitor.

```
unsigned int sensorValue;
// adjust this threshold based on
// actual lighting conditions
const unsigned int thresholdValue = 750;
unsigned int count;
bool objectFlag;

void setup() {
  Serial.begin(9600);
}

void loop() {
  sensorValue = analogRead(A0);
 if(sensorValue <= thresholdValue) {
      if(objectFlag == false) {
        //object detected so increment count
        count++;
        objectFlag = true;
        Serial.print("COUNT=");
        Serial.println(count);
      }
  }
  else objectFlag = false;
  delay(50);
}
```

When using this sketch, it is important to set the correct threshold first. This will vary under the present lighting condition where your setup is.

Ambient Light Controlled DC lamp

A PWM controllable load such as a DC LED light may be automatically controlled for brightness depending on the ambient light. The following sketch dims the lighting unit as the ambient light drops. Brightness is increased with ambient light. This sketch uses pin 3 as the PWM pin for the lighting unit. Pin A0 is used for the sensor

```
unsigned int sensorValue;
```

```
byte pwmValue;
const byte LAMP = 3;

void setup() {
  pinMode(LAMP,OUTPUT);
  Serial.begin(9600);
}

void loop() {
  //read from sensor
  sensorValue = analogRead(A0);

  // keep the limits withint 300 and 800
  // change these according to your setup
  if(sensorValue <= 250) sensorValue = 300;
  if(sensorValue >= 850) sensorValue = 800;

  //compute
  pwmValue = map(sensorValue,250,850,0,255);
  //write pwm value into the pin
  analogWrite(LAMP,pwmValue);
  delay(50);
}
```

Night Light

A basic night light switch may be implemented by modifying previous sketches. The following code uses a relay ,or transistor, depending on the lamp used, to switch the light on when it is dark enough and turns in back off during the day.

```
unsigned int sensorValue;
const unsigned int thresholdValue = 600;
bool flag;
const byte LAMP = 13;

void setup() {
  pinMode(LAMP,OUTPUT);
  Serial.begin(9600);
}

void loop() {
  // read from sensor
  sensorValue = analogRead(A0);
  Serial.println(sensorValue);

  // check for threshold
  if(sensorValue <= thresholdValue) {
      if(flag == false) {
        // turn on lamp
        digitalWrite(LAMP,HIGH);
        flag = true;
      }
  }
  else {
    //turn off lamp
    digitalWrite(LAMP,LOW);
    flag = false;
  }
  delay(50);
}
```

In actual installation, additional code may be inserted, for example, to filter false trigger sources coming from transient light sources such as passing vehicles. You may also need to adjust the potentiometer or threshold for acceptable performance.

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