

# METE HOCA PANDASHIELD



## EXTENDED EDUCATION SHIELD (Rev.1)

USER MANUAL

(Last update: 31 May 2023)

[www.metehoca.com](http://www.metehoca.com)



## **METE HOCA PRODUCTS | [CHECK TINDIE STORE](#)**

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Essential components, sensors, external connections and more in one compact Arduino shield. Empower your creativity!

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Learn the basics of electronics and Arduino programming with ease with this simple but well-crafted Arduino Uno shield.

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Mete Hoca LogicShield is a logic gate education shield for Arduino Uno. It emulates logic gates with a simple Arduino sketch.

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Compact and Comprehensive STEM Logic Gates Experimentation Lab Board for Educational Purposes

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Mete Hoca Panda is a Button-LED-Buzzer based mini gaming console that helps learning Arduino with a entertaining way.

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Pinout Sticker for ATmega328P DIP package

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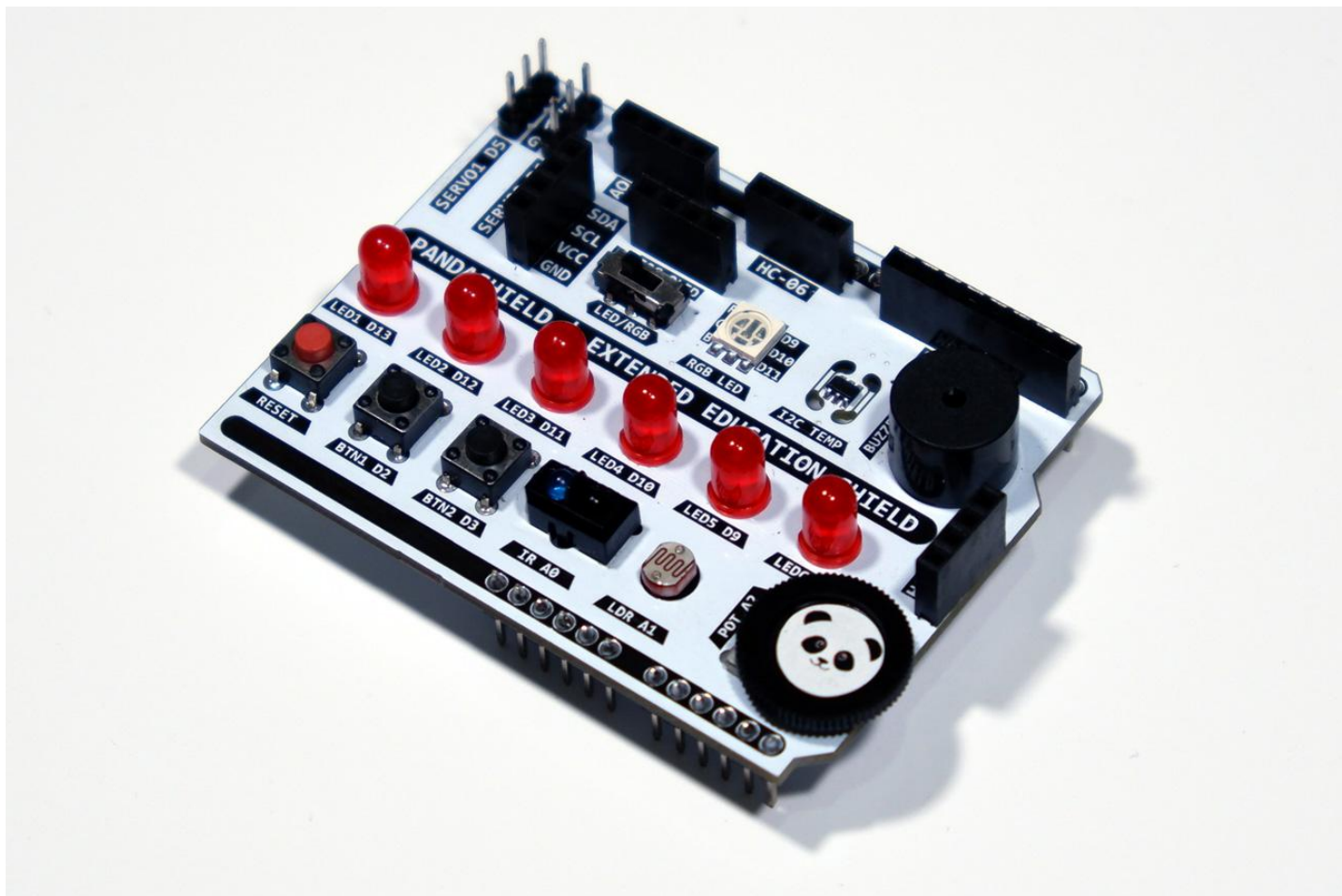
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May 2023, Mete K. Atay

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## METE HOCA PANDASHIELD | EXTENDED EDUCATION SHIELD

*Essential components, sensors, external connections and more in one compact Arduino shield. Empower your creativity!*



Introducing the PandaShield, the ultimate Arduino Uno shield designed specifically for students and beginners in the world of Arduino. Crafted by an experienced electronic engineer and teacher, this compact shield is your all-in-one solution for an immersive and comprehensive Arduino learning experience.

The PandaShield is packed with a range of essential electronic components that will enable students to explore various projects and concepts. It features six 5mm LEDs, perfect for visual feedback and creating stunning light effects. Three buttons offer tactile input for interactive control, while a buzzer adds audio feedback to your projects.

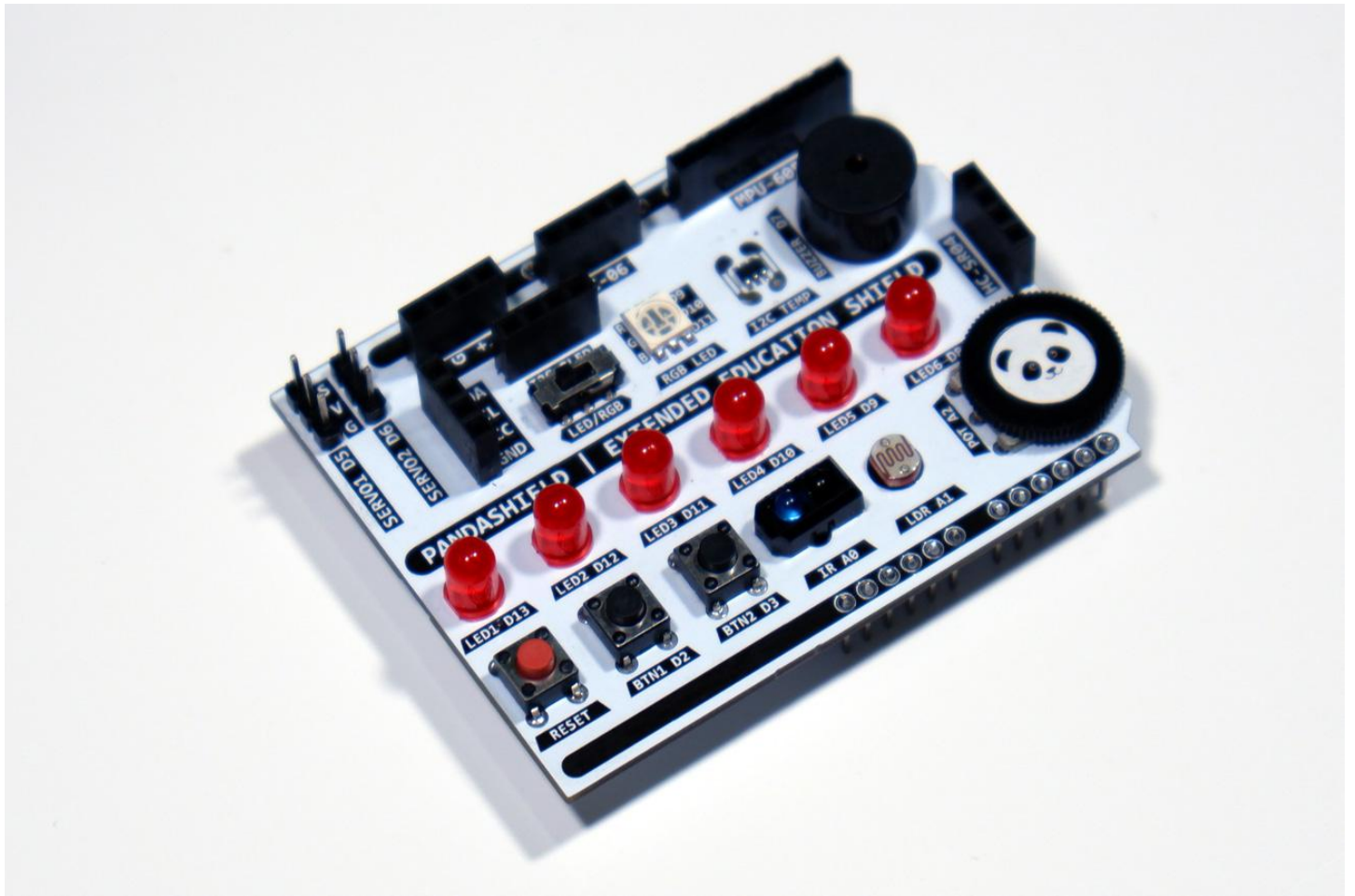
With a built-in potentiometer, students can easily experiment with analog input and learn about voltage division. The included LDR light sensor allows for exploring light-based applications and automation. The RGB LED opens up endless possibilities for color mixing and visual expression.

For environmental sensing, the PandaShield is equipped with the precise and accurate I2C digital temperature sensor, PCT2075. This sensor enables temperature monitoring and integration into climate control projects.

The built-in TCRT5000 infrared sensor module and HC-SR04 ultrasonic distance sensor connection offer opportunities to delve into proximity sensing and obstacle detection. These sensors provide real-world interactivity and expand the range of projects students can create.

The PandaShield goes beyond basic components, with two external mini servo connections for exploring robotics and motion control. It also features two I2C OLED display connections for integrating graphical

output into your projects, providing visual feedback and enhancing user interfaces. It also has external HC-06 Bluetooth Module and MPU-6050 gyro/accelerometer sensor connection.



In addition, the shield includes an external universal sensor connection, compatible with various KY type Arduino sensors. This ensures compatibility with a wide range of sensors and expands the versatility of the PandaShield even further.

Designed with careful attention to detail, the PandaShield is compact, sturdy, and easy to use. It provides a safe and convenient platform for students to learn and experiment with Arduino programming and electronics. The shield neatly sits on top of the Arduino Uno, allowing for seamless integration and minimizing setup time.

Whether you're a student, a teacher, or an Arduino enthusiast, the PandaShield is your gateway to the exciting world of Arduino. With its comprehensive range of components and sensors, it offers limitless possibilities for learning, creativity, and innovation.

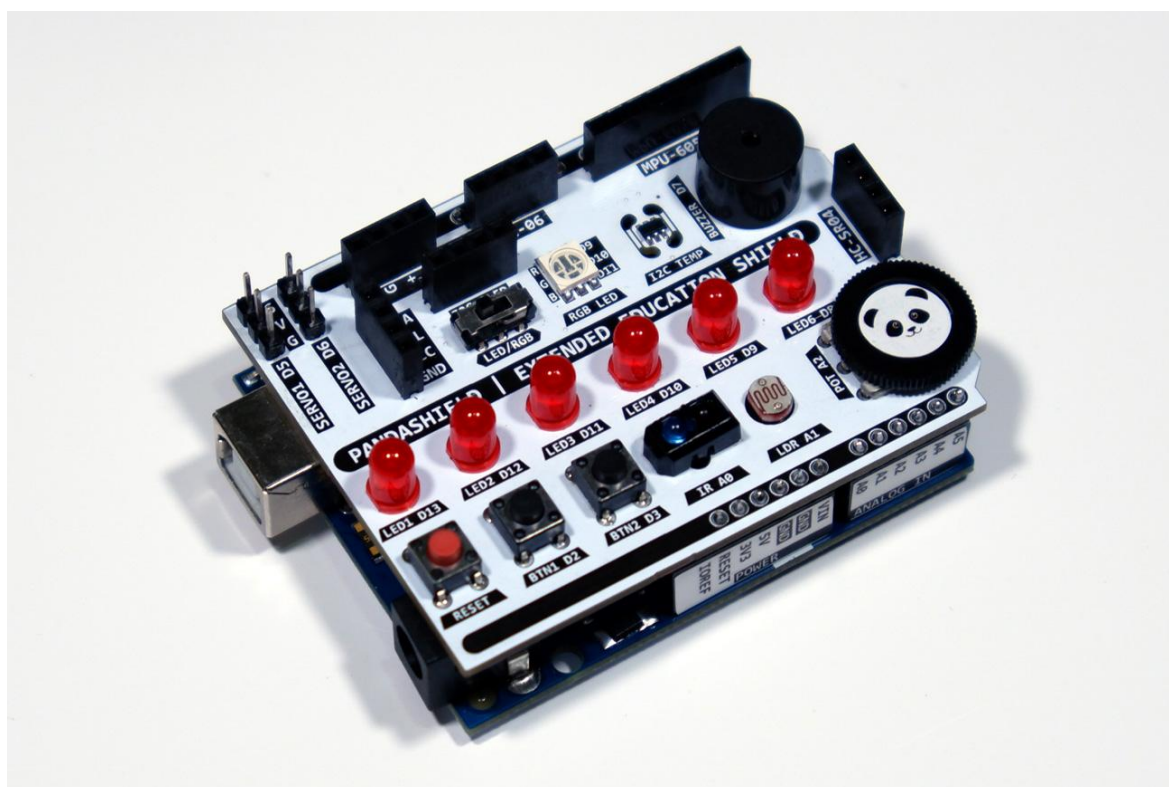
Note: Arduino Uno and external components (mini servos, HC-SR04, HC-06, MPU-6050 and I2C OLED displays) are not included.

## READ BEFORE USING: PANDASHIELD INSTRUCTIONS

To ensure a safe and successful experience with your shield, please carefully read and follow the instructions below:

1. Shield Placement:
  - Before connecting the shield, make sure your Arduino Uno is powered off.
  - Align the shield's pins with the corresponding headers on the Arduino Uno.
  - Gently press the shield onto the headers, ensuring a secure connection.
  - Double-check the alignment to avoid bending any pins.
2. Environmental Precautions:
  - Keep the shield away from liquids, including water, beverages, or any other moisture source.
  - Do not operate the shield in humid or wet environments to prevent damage.
  - Store the shield in a dry and clean place when not in use.
  - Avoid exposure to extreme temperatures or direct sunlight.
3. Handling and Transport:
  - Always handle the shield with care and avoid excessive force or pressure.
  - Do not drop or strike the shield, as it may result in damage to the components.
  - When transporting the shield, use an anti-static bag or container to prevent electrostatic discharge (ESD).
  - Avoid storing or placing the shield on metal surfaces or objects to prevent short circuits.
4. Additional Safety Measures:
  - Do not attempt to modify or tamper with the shield's internal components.
  - Unplug the Arduino Uno from the power source when not in use or during maintenance.
5. Shield Maintenance:
  - Periodically check the shield for any loose connections, damaged pins, or signs of wear.
  - Clean the shield using a soft, dry cloth. Do not use water or any cleaning agents.
  - If you need to clean the shield's pins, use a small brush or compressed air to remove dust or debris gently.

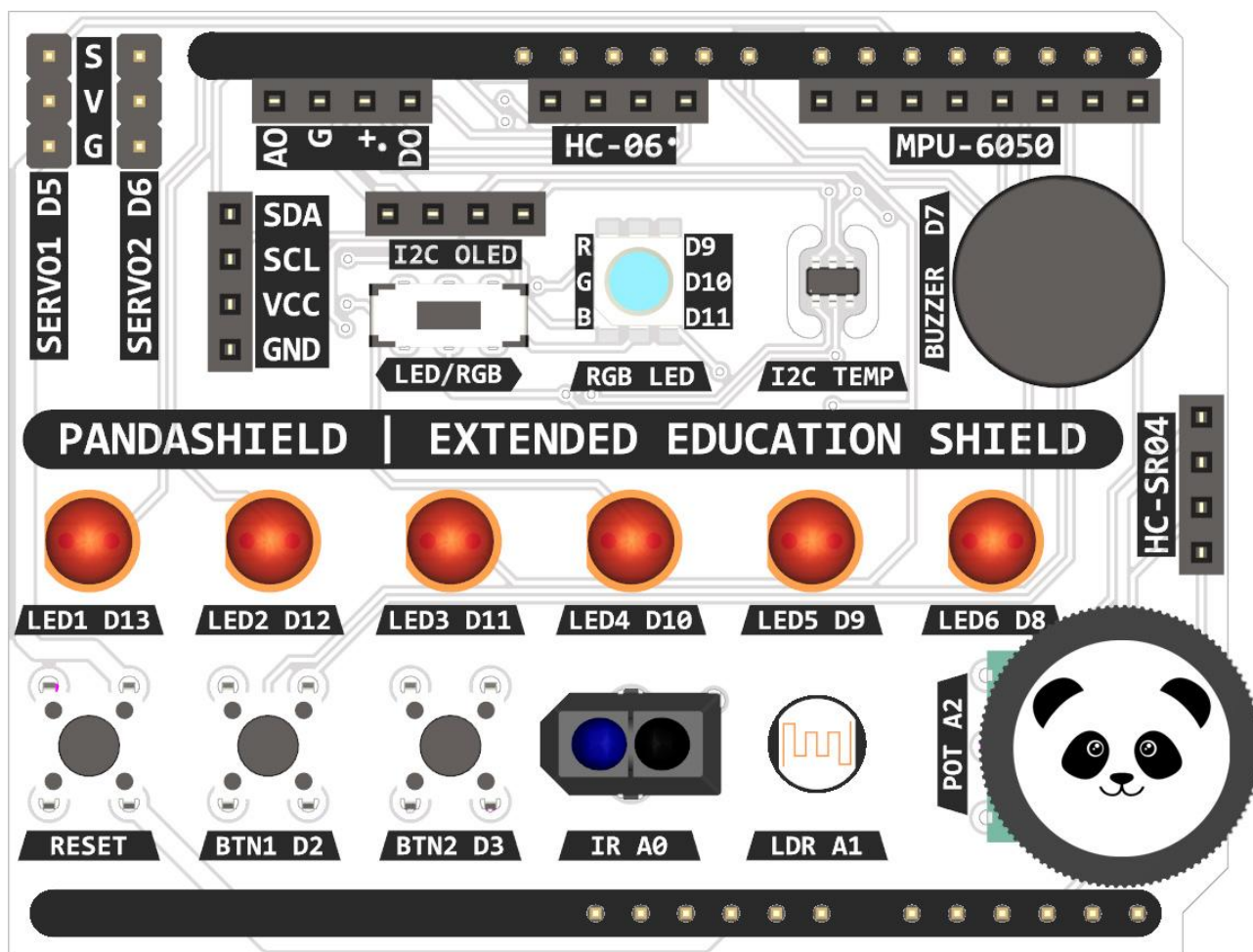
By following these instructions, you will maximize the lifespan of your PandaShield and ensure safe and reliable operation. Remember, if you have any questions or concerns, refer to the user manual or contact me for assistance.





## LET'S TAKE A CLOSER LOOK AT THE PANDASHIELD

Hi, I'm PandaShield, your extended Arduino education shield!



**METE HOCA PandaShield** combines lots of different components in a small package. It has six LEDs, three buttons, a potentiometer, an RGB LED, a passive buzzer, an LDR light sensor, **TCRT5000** infrared sensor and an I2C digital temperature sensor (**NXP PCT2075**).

It uses nearly all digital and analog pins of Arduino Uno. Shield does not use D0 and D1 digital pins. It's not recommended to use these pins because they are used for **UART** communication with USB interface.

PandaShield also has many external module connectors. Two of them are **micro servo** connector for SG90 type tiny servos, other two are I2C connectors that can be used for 128x32 and 128x64 pixel **OLED displays**. These connectors use Arduino Uno's **A4 (SDA)** and **A5 (SCL)** pins for I2C connection. Shield also has external connectors for well-known modules that **HC-SR04** ultrasonic distance sensor, **MPU-6050** gyro and **HC-06** Bluetooth module. It also has an universal connector for some **KY-XXX** type sensor modules.

All the components on the shield has its own label that shows its name and Arduino pin number. For example **LED1 D13** means this LED is connected to 13th digital pin of the Arduino. **IR A0** means infrared sensor is connected to A0 analog pin of the Uno.

BTN1 and BTN2 have their own pull-down resistors connected, so there is **no need to use** internal pull-up resistors of the Arduino microcontroller. Set them as input and they will generate HIGH signal when pressed. RESET button is connected to RESET pin of the Arduino.

Six 5 mm red LEDs and RGB LED has their own current limiter resistors. Resistor values set **wisely**, so LEDs do not light way too bright. Due to shortage of Arduino pins, LED3, LED4, LED5 and RGB LED shares same Arduino pins. **LED/RGB switch** selects desired configuration.

## COMPONENT CONNECTION PINS TABLE

All the components on the shield has it's own label that shows it's name and Arduino pin number. Here's the full list of the connections;

NAME	TYPE	ARDUINO PIN	DESCRIPTION
<b>LED1</b>	Output	D13	Red LED
<b>LED2</b>	Output	D12	Red LED
<b>LED3</b>	Output	D11 (PWM)	Red LED (Shares same pin with RGB LED. Brightness can be change via PWM)
<b>LED4</b>	Output	D10 (PWM)	Red LED (Shares same pin with RGB LED. Brightness can be change via PWM)
<b>LED5</b>	Output	D9 (PWM)	Red LED (Shares same pin with RGB LED. Brightness can be change via PWM)
<b>LED6</b>	Output	D8	Red LED
<b>RGB LED</b>	Output	R=D9 / G=D10 / B=D11	RGB LED (Shares same pins with LED3, LED4, LED5)
<b>LED/RGB</b>	Switch	N/A	Selects between LED3, LED4, LED5 or RGB LED.
<b>RESET</b>	Output	RESET	Resets Arduino
<b>BTN1</b>	Input	D2	Button with dedicated pull-down resistor.
<b>BTN2</b>	Input	D4	Button with dedicated pull-down resistor.
<b>BUZZER</b>	Output	A3	Passive buzzer
<b>POT</b>	Analog Input	A2	Feeds the analog pin with 0-5 Volt.
<b>LDR</b>	Analog Input	A1	Has its own voltage divider circuit for easy use.
<b>IR</b>	Analog Input	A0	TCRT5000 infrared sensor
<b>TEMP</b>	I2C	I2C (A4 and A5)	NXP PCT2075 digital temperature sensor
<b>I2C</b>	I2C	I2C (A4 and A5)	0.91" 128x32 I2C OLED display connector
<b>I2C OLED</b>	I2C	I2C (A4 and A5)	0.96" 128x64 I2C OLED display connector
<b>SERVO1</b>	Output	D5	Micro servo motor connection. It's recommended to use an external power supply when using servo with Arduino.
<b>SERVO2</b>	Output	D6	Micro servo motor connection. It's recommended to use an external power supply when using servo with Arduino.
<b>HC-SR04</b>	I/O	D4=ECHO / A3=TRIG	Well-known ultrasonic distance sensor
<b>MPU-6050</b>	I2C	I2C (A4 and A5)	I2C Accelerometer/Gyroscope Module
<b>HC-06</b>	UART	D4=TX / A3=RX	Bluetooth module. Has logic level shifter circuit. Pin connection is reverse on UART connections. Write opposite names to sketch.
<b>SENSOR</b>	I/O	D4=DO / A3=AO	Universal connector for some KY-XXX type sensor modules. Compatible with KY-024, KY-025, KY-026, KY-028, KY-036, KY-037 and KY-038.



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