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› KEYESTUDIO DIY Solar Tracking Electronic Kit for Arduino User Manual

KEYESTUDIO K-I-4045

KEYESTUDIO DIY Solar Tracking Electronic Kit for Arduino User Manual

Model: K-I-4045

1. INTRODUCTION

The KEYESTUDIO DIY Solar Tracking Electronic Kit is an educational programming kit designed for individuals interested in electronics and programming. Based on Arduino, this kit enables users to construct a solar tracking system that efficiently converts light energy into electrical energy, suitable for charging compatible devices. It integrates various sensors and modules to enhance the learning experience, including ambient light sensors, servos, a solar panel, a smartphone charging module, a temperature and humidity sensor, a BH1750 light sensor, a buzzer, an LCD1602 display, a push button module, and an LED module.



Figure 1: Overview of the assembled kit highlighting key electronic modules.

2. PACKAGE CONTENTS

Before beginning assembly, please verify that all components listed below are present in your kit. Refer to the image for visual confirmation of each part.

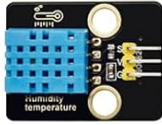
	 Solar Panel with Tape And Wires*1	 Acrylic Board*5	 Wooden Board 3mm* 4	 Keyestudio Development Board*1	 I2C1602*1
 Lithium Power *1	 Smart Phone Charging*1	 Passive Buzzer*1	 Yellow LED*1	 Button*1	 Temperature and Humidity Sensor*1
 BH1750FVI Digital Light Intensity*1	 Photoresistor* 4	 Mounting Bracket Kit*1	 Battery Holder*1	 Servo*2	 USB Cable*1
 Building Blocks 43093*18	 Building Blocks 4265c*18	 M4*8MM Round Head Screw*2	 M4 Nickle-plated Nut*2	 M3*14MM Flat Head Screw*14	 M3 Nickle-plated Nut*6
 M3*8MM Flat Head Screw*29	 M3*45MM Double Pass Copper Pillar*8	 M3*6+6MM Single Pass Copper Pillar*4	 M3*10MM Double Pass Copper Pillar*7	 Plastic Pipe*1	 Plastic String*4
 4P 26AWG 200mm DuPont Wire*1	 4P F-F 26AWG 350mm DuPont Wire*1	 3P 26AWG 200mm F-F DuPont Wire*7	 20cm M to F DuPont Wire*1	 2.0*40MM Screwdriver*1	 3.0*40MM Screwdriver*1

Figure 2: All components included in the kit. Ensure all parts are accounted for before proceeding.

- Keyestudio UNO Development Board x1
- I2C1602 LCD Module x1
- Lithium Power Module x1
- Smart Phone Charging Module x1
- Passive Buzzer x1
- Yellow LED Module x1
- Button Module x1
- Temperature & Humidity Sensor x1
- BH1750FVI Digital Light Intensity Module x1
- Photoresistor Module x4
- Mounting Bracket Kit x1
- Battery Holder x1 (Note: 1 Lithium Ion battery required, not included)
- Servo x2

- USB Cable x1
- Solar Panel with Tape And Wires x1
- Acrylic Board x5
- Wooden Board 3mm x4
- Building Blocks (various sizes)
- M4*8MM Round Head Screw x2
- M4 Nickle-plated Nut x2
- M3*14MM Flat Head Screw x14
- M3*8MM Flat Head Screw x29
- M3*45MM Double Pass Copper Pillar x8
- M3*6+6MM Single Pass Copper Pillar x4
- M3*10MM Double Pass Copper Pillar x7
- Plastic Pipe x1
- Plastic String x4
- 4P 26AWG 200mm DuPont Wire x1
- 4P F-F 26AWG 350mm DuPont Wire x1
- 3P 26AWG 200mm F-F DuPont Wire x7
- 20cm M to F DuPont Wire x1
- 3.0*40MM Screwdriver x1
- 2.0*40MM Screwdriver x1

3. SETUP AND ASSEMBLY

The KEYESTUDIO Solar Tracking Kit is provided unassembled. Detailed online tutorials are available to guide you through the assembly process and code uploading. It is crucial to follow these instructions carefully. A 3.7V Lithium Ion battery is required for operation and is not included in the kit; please prepare one separately.

3.1. Online Tutorials

Access the comprehensive online tutorials for step-by-step assembly instructions and programming guides. These tutorials cover everything from basic module control to integrating all components for the solar tracking functionality.

3.2. Servo Calibration

Before final assembly, calibrate the servos as indicated in the instructions. Proper calibration ensures accurate movement of the solar panel for optimal tracking.

3.3. Wiring and Connections

Carefully connect all modules and sensors to the Keyestudio UNO Development Board using the provided DuPont wires. Pay close attention to the polarity and pin assignments specified in the online guide to prevent damage to components.

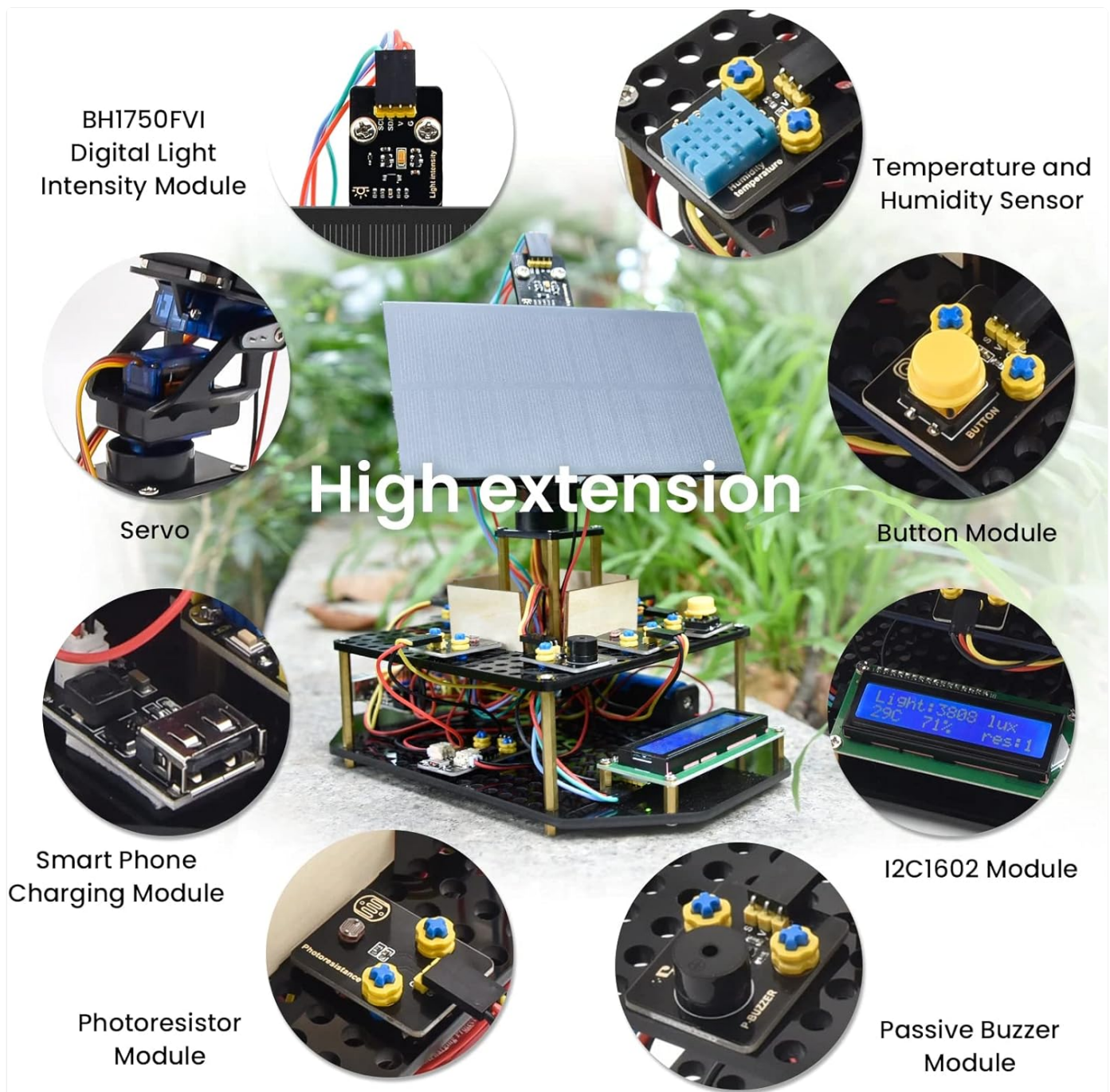


Figure 3: The fully assembled solar tracking kit, ready for operation.

4. OPERATING INSTRUCTIONS

4.1. Solar Tracking Functionality

The kit is designed to automatically track the sun's position. The 4 ambient light sensors detect the light intensity, and the 2 DOF servos adjust the solar panel's angle ($180^{\circ}+180^{\circ}$ range) to maximize light exposure. This ensures efficient conversion of light energy.



Figure 4: The solar panel automatically adjusts its position to follow the light source.

Your browser does not support the video tag.

Video 1: Demonstration of the KEYESTUDIO Solar Tracking Kit's automatic light tracking and sensor display features.

4.2. Smartphone Charging

The kit includes a smartphone charging module. Once the internal battery is sufficiently charged by the solar panel, you can connect your smartphone to the charging module to power it. The charging module outputs 5V/1A. Note that this module may not support iOS systems.

- ① The solar panel can be flipped up & down following the light to charge the battery.
- ② Aiming to convert light energy into electronic energy and when the battery is fully charged charge electrical devices.

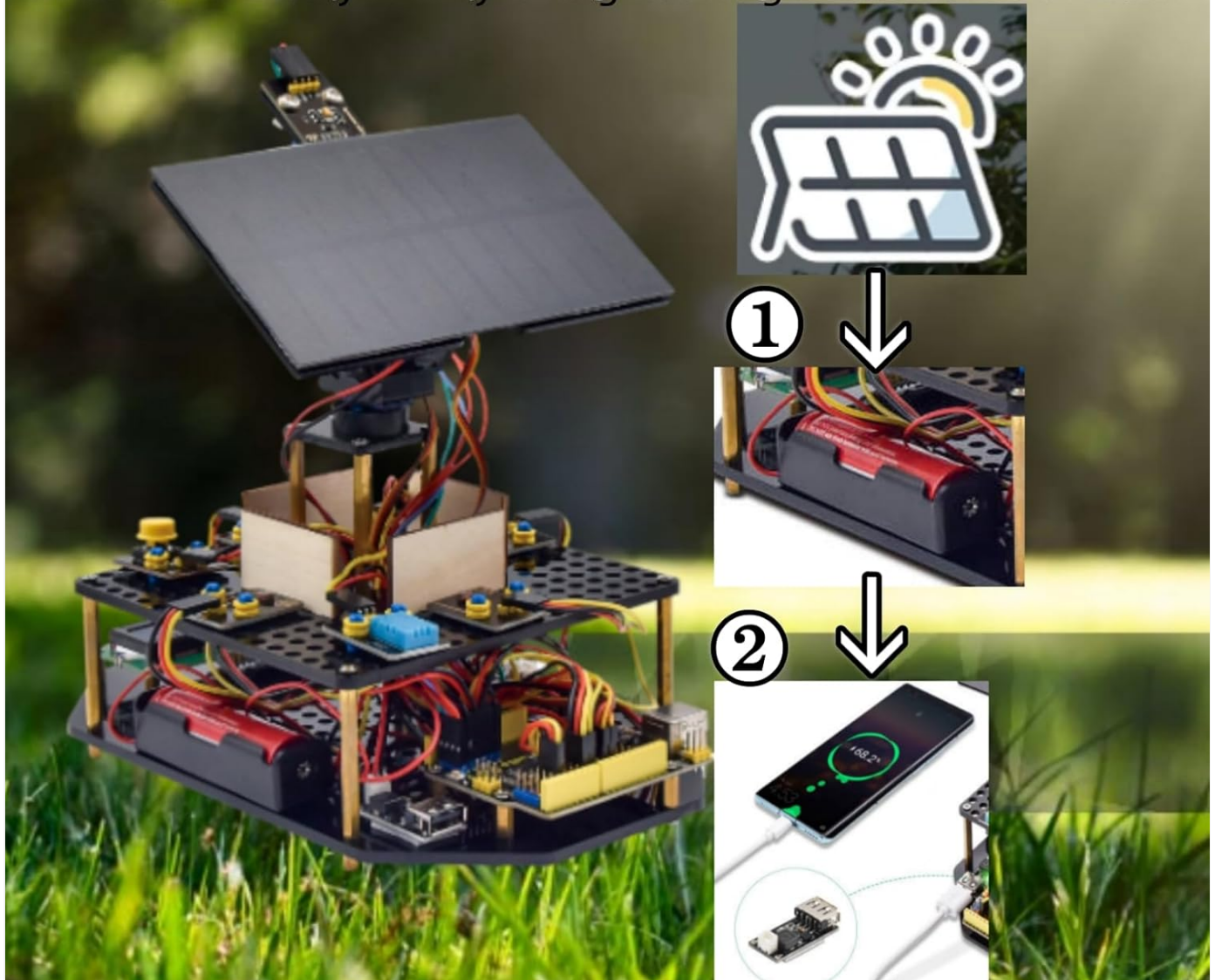


Figure 5: The solar panel charges an internal battery, which then powers the smartphone charging module.

4.3. Reading Sensor Data

The LCD1602 display shows real-time data from the integrated sensors. This includes light intensity (lux) from the BH1750 sensor, temperature, and humidity from the DHT11 sensor. This allows for monitoring environmental conditions.

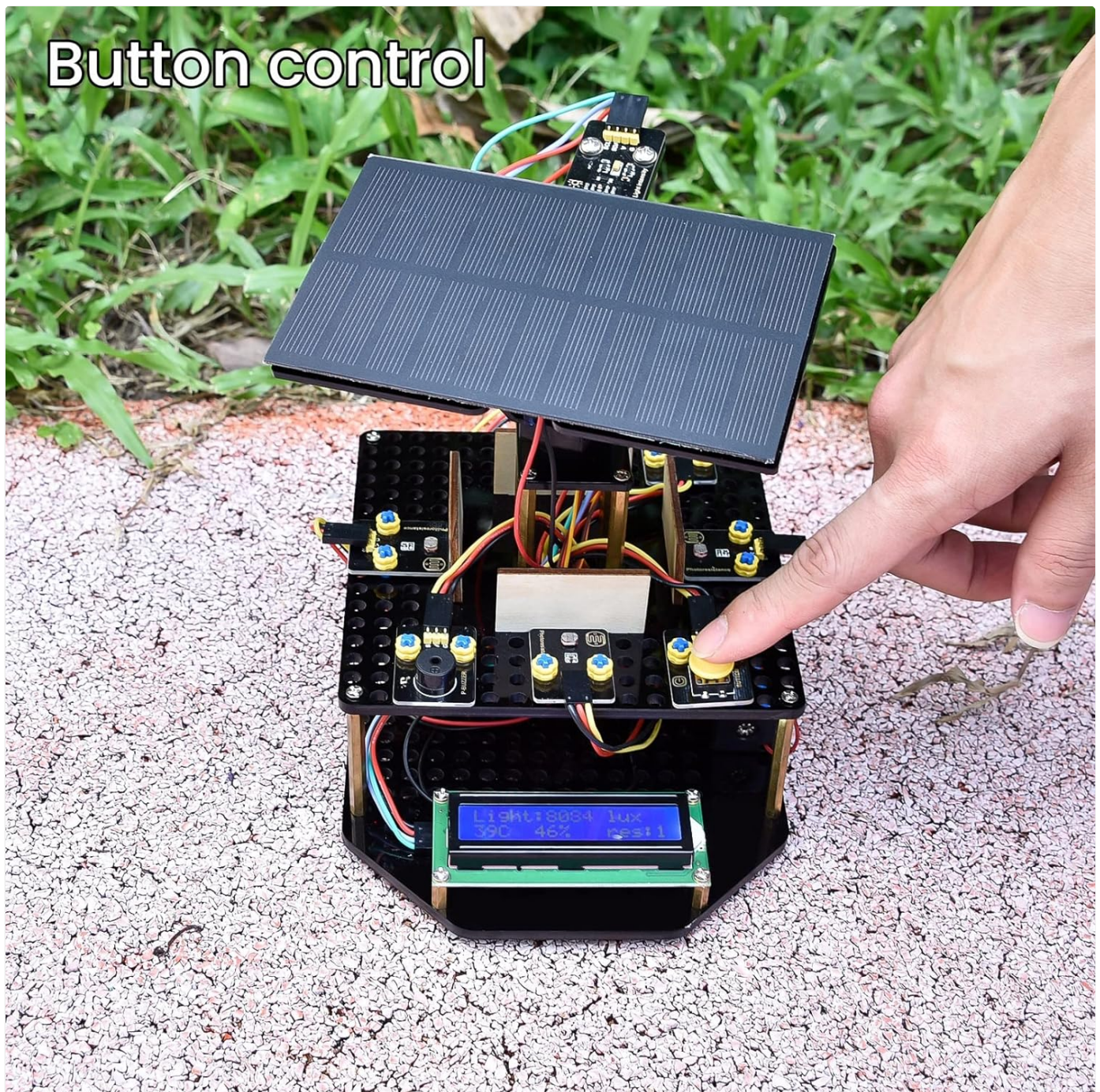


Figure 6: The LCD screen displays current light intensity, temperature, and humidity values.

4.4. Manual Control

A push button module is included, allowing for manual interaction or control over certain functions as programmed. This can be used to override automatic tracking or trigger specific actions.

5. MAINTENANCE

- **Cleaning:** Keep the solar panel and sensors clean from dust and debris to ensure optimal performance. Use a soft, dry cloth for cleaning.
- **Storage:** When not in use, store the kit in a dry, cool place away from direct sunlight and extreme temperatures.
- **Battery Care:** If using a rechargeable battery, follow the manufacturer's guidelines for charging and discharging to prolong its lifespan. Remove the battery if the kit will not be used for an extended period.
- **Component Inspection:** Periodically check all connections and components for any signs of wear or damage. Ensure all screws are tightened.

6. TROUBLESHOOTING

Problem	Possible Cause	Solution
Kit does not power on.	- Battery not connected or discharged. - Incorrect wiring. - USB power not connected (if applicable).	- Ensure battery is charged and correctly connected. - Double-check all power connections according to the manual. - Connect the USB cable to a power source.
Solar panel not tracking light.	- Light sensors obstructed or faulty. - Servo motors not connected or calibrated. - Incorrect code uploaded.	- Ensure sensors are clear and functioning. - Verify servo connections and perform calibration. - Re-upload the correct solar tracking code.
LCD display shows no text or incorrect data.	- LCD wiring incorrect. - I2C address mismatch in code. - Sensor not connected or faulty.	- Check LCD connections. - Verify I2C address in the Arduino code. - Ensure relevant sensors are properly connected.
Smartphone charging not working.	- Internal battery not charged. - Charging module wiring incorrect. - Device incompatibility (e.g., iOS).	- Ensure the internal battery has sufficient charge. - Check connections to the charging module. - Confirm device compatibility.

7. SPECIFICATIONS

Feature	Detail
Model Number	K-I-4045
Package Dimensions	9.33 x 5.75 x 3.03 inches
Item Weight	1.7 pounds
Battery Requirement	1 Lithium Ion battery (not included)
Smartphone Charging Output	5V/1A (may not support iOS)
Solar Panel Tracking Range	180° + 180° (2 DOF servos)
Included Sensors	Ambient Light Sensors (4), Temperature & Humidity Sensor (DHT11), BH1750 Light Sensor
Display	LCD1602

8. WARRANTY AND SUPPORT

KEYESTUDIO is committed to providing quality educational kits. For any questions regarding assembly, programming, or troubleshooting that are not covered in this manual or the online tutorials, please contact KEYESTUDIO customer support. While specific warranty details are not provided here, general support for product functionality and component replacement (if applicable) can be obtained through official channels.

Visit the [KEYESTUDIO Store on Amazon](#) for more information and to access additional resources.