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› DIYmall WS2812B 16-Bit RGB LED Ring Instruction Manual

DIYmall 16 Bits RGB LED Rings (WS2812B)

DIYmall WS2812B 16-Bit RGB LED Ring Instruction Manual

Model: 16 Bits RGB LED Rings (WS2812B) | Brand: DIYmall

1. PRODUCT OVERVIEW

The DIYmall 16-Bit RGB LED Rings are compact, individually addressable lighting components featuring WS2812B 5050 RGB LEDs. Each ring contains 16 LEDs, allowing for full-color control with 256 levels of brightness for each color (Red, Green, Blue), resulting in 16,777,216 possible colors. These rings are designed for integration into various electronic projects, particularly with microcontrollers like Arduino, using a single-wire communication protocol.

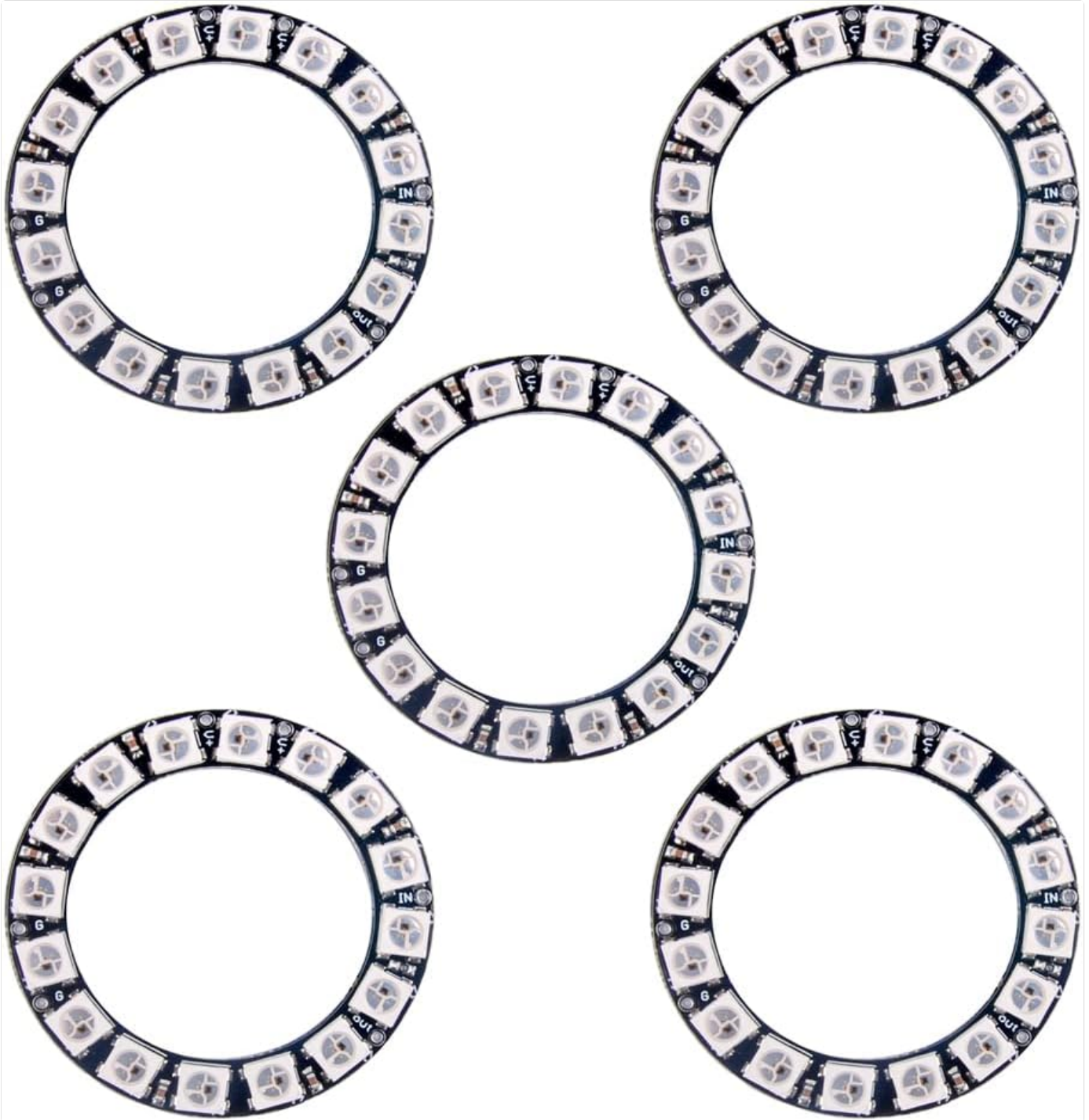


Figure 1.1: Five 16-Bit RGB LED Rings included in the package.

2. TECHNICAL SPECIFICATIONS

Feature	Specification
LED Chip	WS2812B (5050 RGB)
Number of LEDs	16 per ring
Input Voltage	DC 4-7V (Nominal 5V)

Feature	Specification
Communication Interface	Single-wire communication
Color Depth	24-bit (16,777,216 colors)
Outside Diameter	45mm (1.77 inches)
Inside Diameter	32mm (1.25 inches)
Product Dimensions	1.77"W x 1.77"H
Item Weight	0.634 ounces (per 5PCS package)

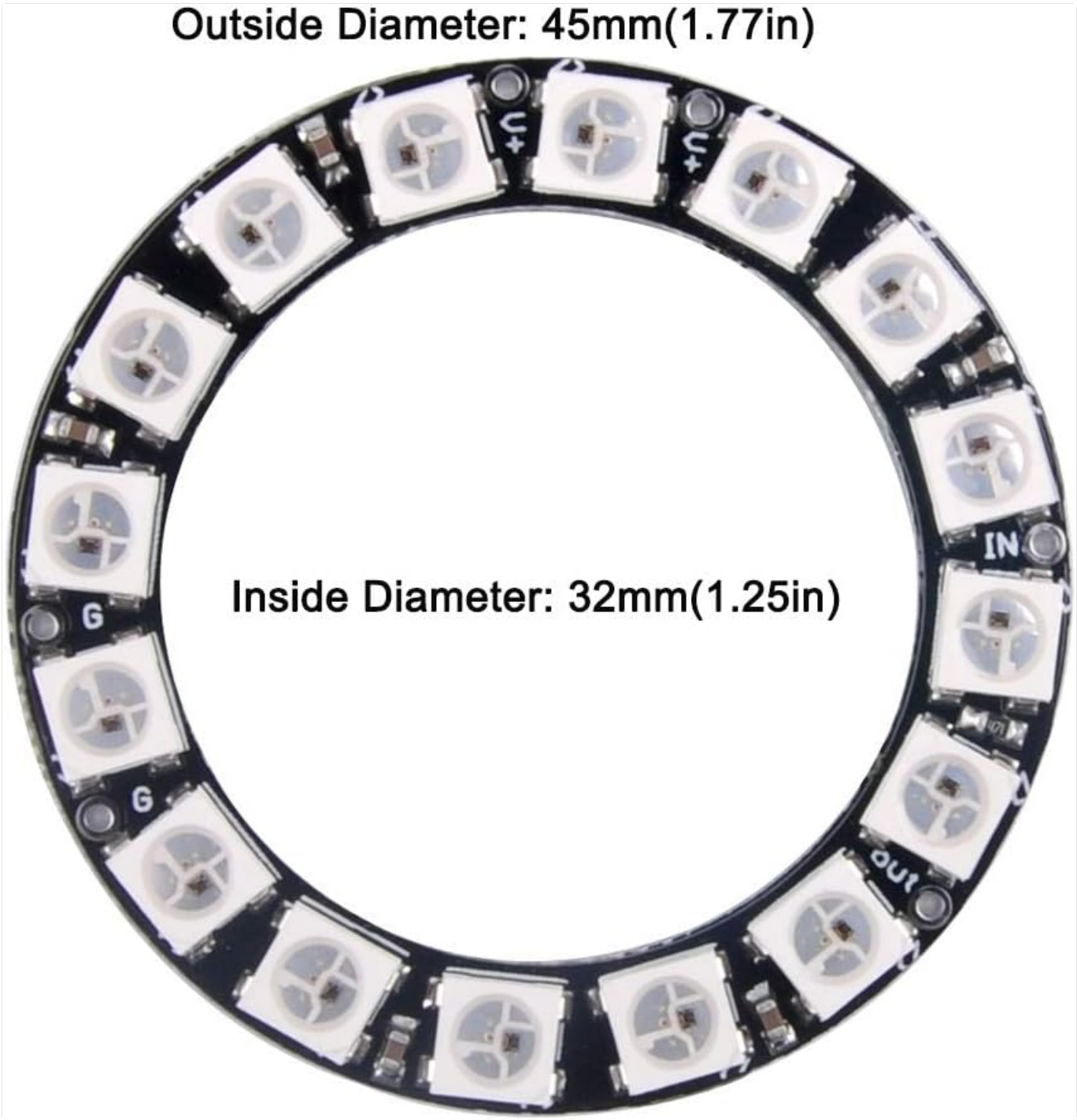


Figure 2.1: Detailed dimensions of the LED ring.

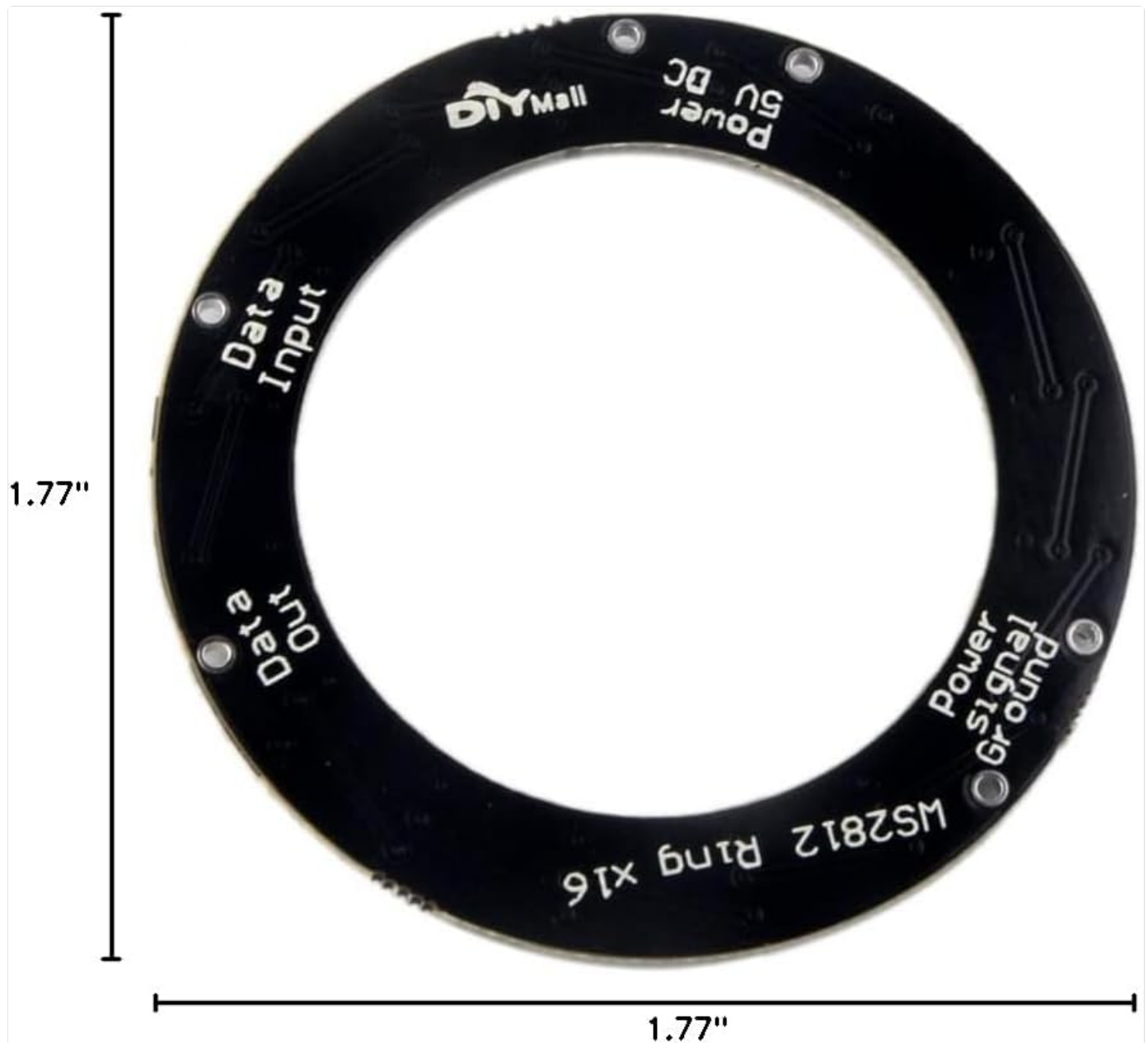


Figure 2.2: Overall dimensions of the LED ring.

3. SETUP AND CONNECTION

Connecting the WS2812B LED rings to a microcontroller like Arduino is straightforward, requiring only three connections: Power, Ground, and Data Input. Ensure your power supply can provide sufficient current for all LEDs at full brightness.

3.1 Pinout Description



Figure 3.1: Pin labels on the back of the LED ring.

- **Power 5V DC (VCC):** Connect to a 5V power source.
- **Data Input (DI):** Connect to a digital output pin of your microcontroller (e.g., Arduino).
- **Data Out (DO):** Used for daisy-chaining multiple LED rings. Connect to the Data Input of the next ring.
- **Power Signal Ground (GND):** Connect to the common ground of your power supply and microcontroller.

3.2 Connection Diagram (Example with Arduino)

Connction:

5V to 5V

pin 6 to DI

GND to GND

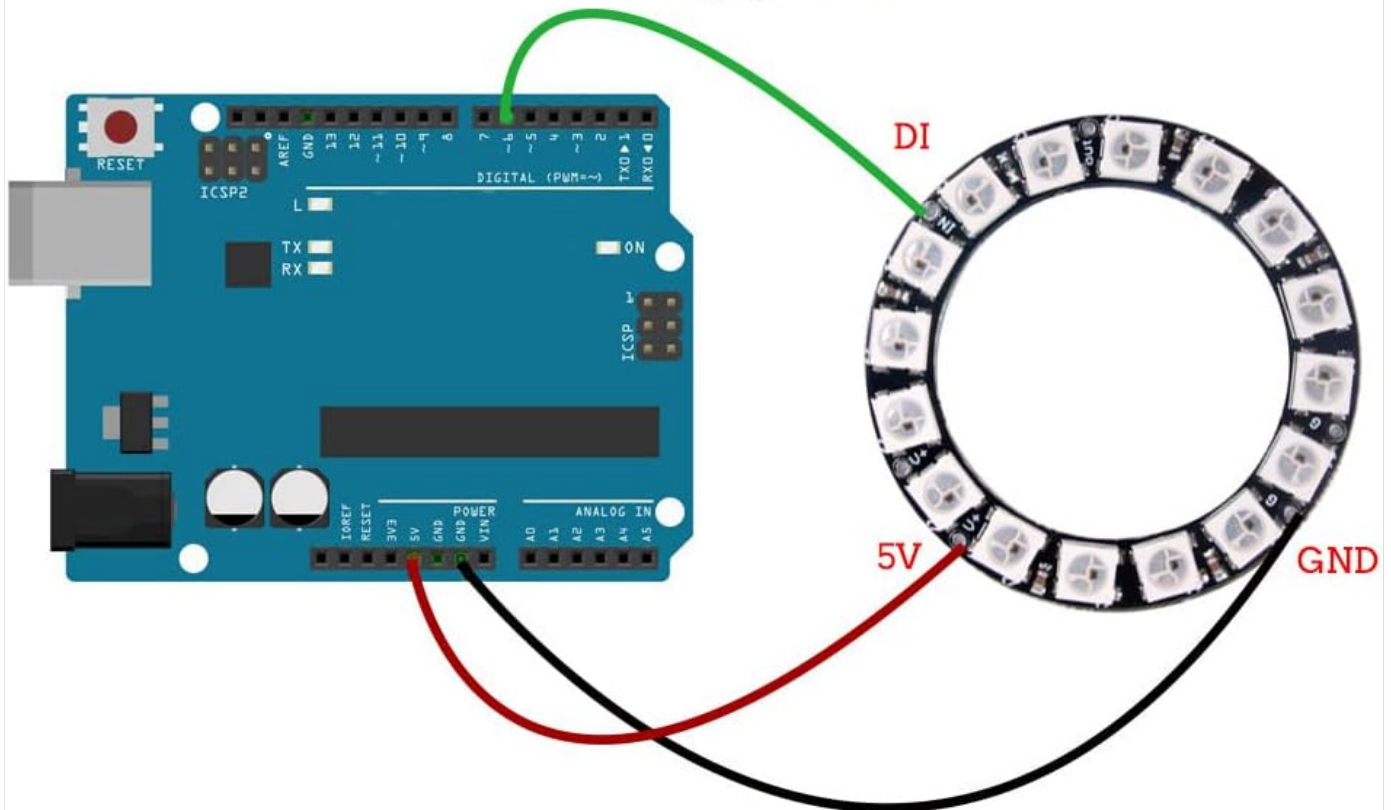


Figure 3.2: Example connection of the LED ring to an Arduino board.

Follow these steps for a basic connection:

1. Connect the **5V** pin of the LED ring to the **5V** output of your Arduino or external 5V power supply.
2. Connect the **GND** pin of the LED ring to the **GND** pin of your Arduino.
3. Connect the **DI (Data Input)** pin of the LED ring to a digital output pin on your Arduino (e.g., Digital Pin 6).
4. For optimal performance and to prevent damage, it is recommended to place a 300-500 ohm resistor in series with the data line (DI) if the data line is long or if there is a significant voltage difference between the microcontroller and the LED ring. Also, consider adding a large capacitor (e.g., 1000 μ F) across the 5V and GND lines near the LED ring for power stability, especially when driving many LEDs.

4. OPERATION AND PROGRAMMING

The WS2812B LEDs are individually addressable, meaning each LED on the ring can be controlled independently to display a specific color and brightness. This is achieved through a single-wire control protocol.

4.1 Programming with Arduino

To program the WS2812B LED rings with Arduino, the Adafruit NeoPixel library is highly recommended. This library simplifies the control of these LEDs significantly.

- **Install the Library:** In the Arduino IDE, go to `Sketch > Include Library > Manage Libraries...` and search for "Adafruit NeoPixel". Install the library.
- **Example Code:** The Adafruit NeoPixel library includes various examples that demonstrate how to light up individual LEDs, create animations, and control brightness. You can find the code link and more examples at the [Adafruit NeoPixel GitHub repository](#).
- **Basic Control:** Each LED is assigned an index (0 to 15 for a 16-bit ring). You can set the color of each LED using RGB values (0-255 for Red, Green, and Blue).



Figure 4.1: LED ring displaying red light.

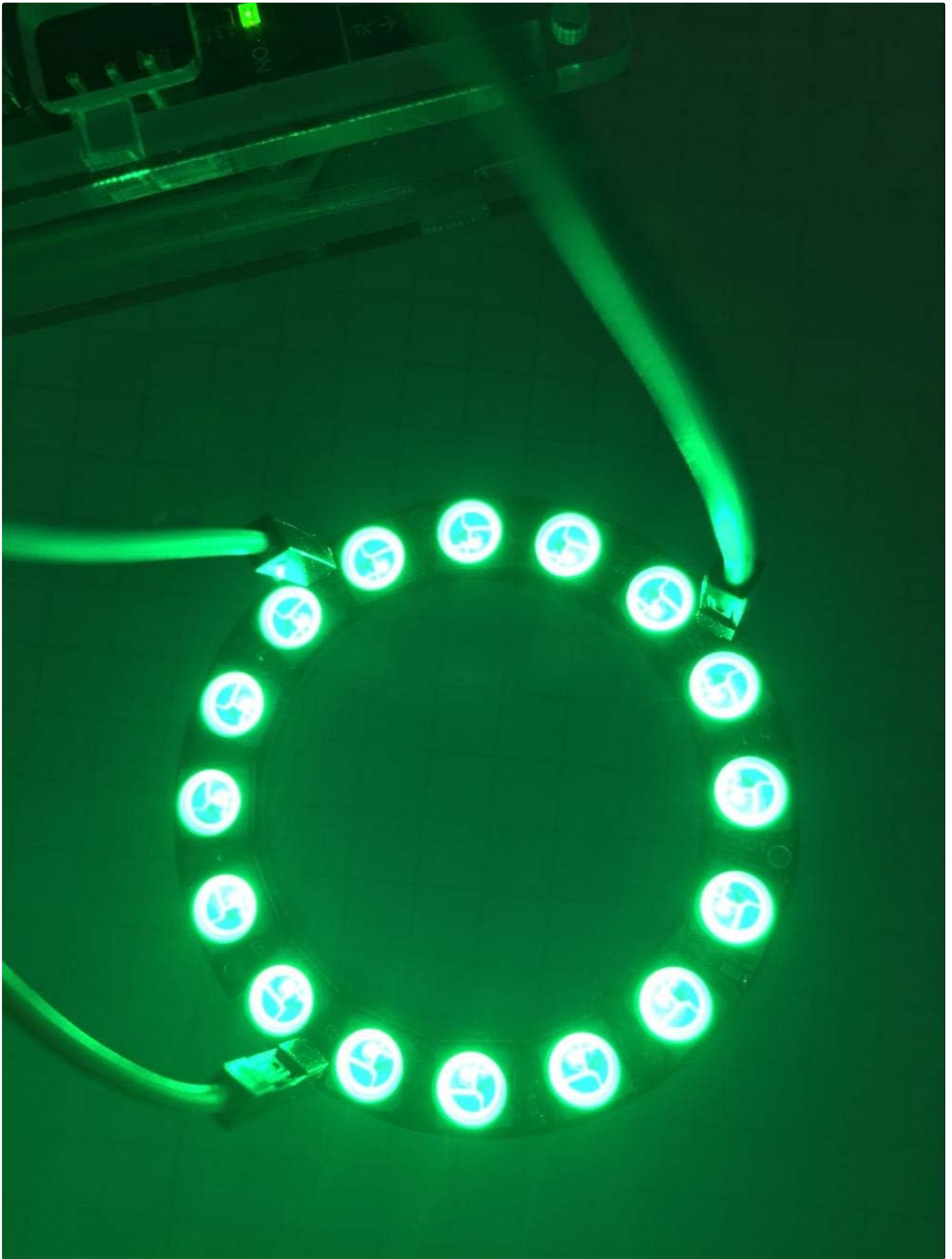


Figure 4.2: LED ring displaying green light.

5. CARE AND MAINTENANCE

To ensure the longevity and optimal performance of your DIYmall WS2812B LED Rings, please follow these care and maintenance guidelines:

- **Handle with Care:** Avoid bending or applying excessive force to the circuit board, as this can damage the traces or LED components.
- **Power Supply:** Always use a stable DC 5V power supply. Over-voltage can permanently damage the LEDs. Ensure the power supply can deliver enough current for your project; insufficient current can lead to flickering or dimming.
- **Soldering:** If soldering connections, use appropriate soldering techniques to avoid short circuits or overheating the components. Use a fine-tip soldering iron and lead-free solder if possible.
- **Environmental Conditions:** Store and operate the LED rings in a dry environment. Avoid exposure to moisture, extreme temperatures, or corrosive substances.
- **Cleaning:** If necessary, gently clean the surface with a soft, dry cloth. Do not use harsh chemicals or abrasive materials.

6. TROUBLESHOOTING

If you encounter issues with your LED rings, consider the following common troubleshooting steps:

- **LEDs Not Lighting Up:**
 - Check power connections (5V and GND) to ensure they are secure and correctly polarized.
 - Verify the data line (DI) connection to your microcontroller's output pin.
 - Ensure your microcontroller is powered on and running the correct code.
 - Confirm the power supply can provide enough current for all LEDs.
- **Incorrect Colors or Flickering:**
 - Check the data line for interference; a resistor (300-500 ohm) in series with the data line can help.
 - Add a large capacitor (e.g., 1000µF) across the 5V and GND lines near the first LED ring to stabilize power.
 - Ensure your code is correctly addressing the LEDs and setting the colors.
 - Verify the correct number of LEDs is defined in your NeoPixel library initialization.
- **Only First Few LEDs Light Up:**
 - This often indicates a power issue. The voltage might be dropping along the strip. Inject power at multiple points for longer chains.
 - Check the data connection between rings if daisy-chaining.
- **Individual LEDs Malfunctioning:**
 - A single faulty LED can sometimes disrupt the data signal for subsequent LEDs in a chain. Isolate the faulty LED if possible.
 - Check for cold solder joints or accidental short circuits.

7. WARRANTY AND SUPPORT

DIYmall products are designed for reliability and performance. While specific warranty details may vary by retailer, a standard 30-day return policy typically applies from the date of purchase for manufacturing defects.

For technical support, programming assistance, or inquiries regarding your DIYmall WS2812B LED Rings, please refer to the official DIYmall store or contact their customer service through the platform where the product was purchased. Online communities and forums dedicated to Arduino and addressable LEDs can also be valuable resources for project-specific help and inspiration.

We encourage users to visit the [DIYmall Store on Amazon](#) for additional product information and resources.

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Question

Example: How do I reset this device or fix this error?

Details

Model number, symptoms, what you tried, or the section of the manual you are using.

Submit question