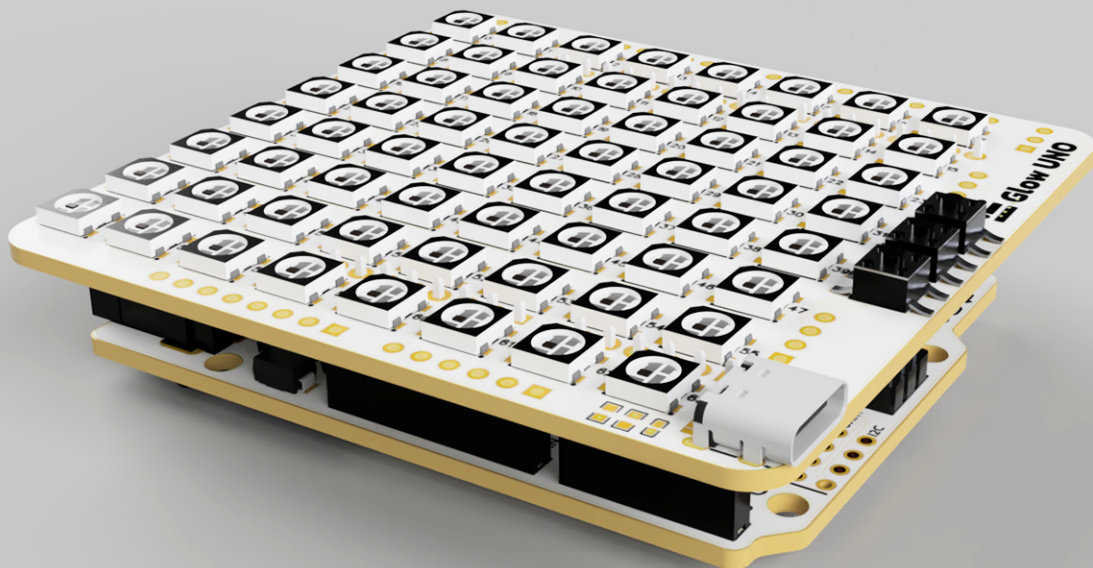


Glow UNO

DATASHEET **SKU : GU01V1S**



Description

The Glow UNO is an 8x8 addressable WS2812B RGB matrix designed to serve as both an Arduino UNO shield and a standalone RGB display. It features 64 individually controllable LEDs, allowing for vibrant and dynamic lighting effects. The Glow UNO includes three built-in push buttons, a USB power port, and an XH connector for additional peripherals, providing extensive functionality and flexibility for various projects. This shield is ideal for creating interactive displays, games, and visual effects, seamlessly integrating with Arduino and other microcontroller platforms.

Technical Specifications

LED Chipset	WS2812B
Number of Pixels (per strip)	64
Pixel Dimensions	5mm x 5mm x 1mm
Voltage	5V DC
Current Consumption at maximum brightness	Per Pixel: 36 mA Per Panel: 2.3 A
Power Consumption at maximum brightness	Per Pixel: 0.18 W Per Panel: 11.5 W
PCB Color	White
Control	Addressable, each pixel can be controlled individually from one data pin
Operating Temperature	-20°C to 60°C
Height	70 mm
Width	73 mm
Weight	25.8g

LED Chipset and Control

The amomii Glow UNO uses the WS2812B chipset, which allows each pixel to be controlled individually from a single data pin. This addressable feature provides a high level of customization and flexibility in creating lighting effects. The amomii Glow UNO can be easily programmed using popular microcontroller boards like the amomii UNO, Arduino or Raspberry Pi using a single data pin.

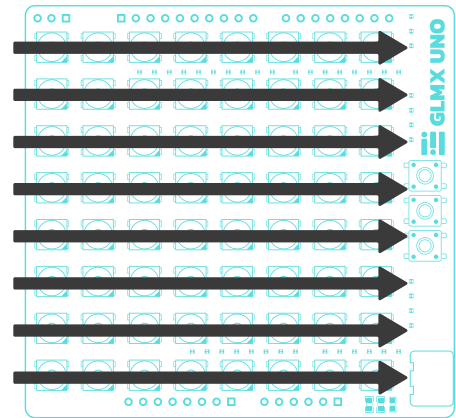
For more details on the WS2812B chipset, refer to its datasheet:

 [See datasheet](#)

Matrix Layout

The LEDs are arranged in a linear pattern, with the numbering starting from 0 in the top-left corner and continuing horizontally to 7, then moving to the next row and continuing from 8 to 15, and so on, down to 63 in the bottom-right corner.

This layout allows for efficient control, enabling the creation of intricate patterns, animations, and dynamic lighting effects with precise pixel-level management. The linear configuration simplifies addressing each LED independently while maintaining a straightforward wiring scheme.



Power

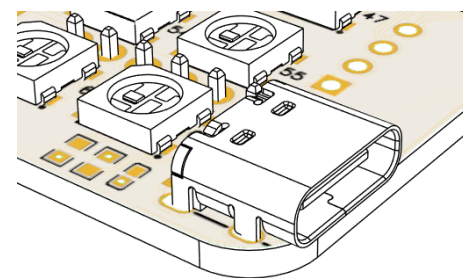
Before powering your projects, it is essential to consider the potential power draw. Each pixel on the Glow UNO shield can draw up to 36 mA of current. With 64 pixels in total, the shield could potentially draw up to 2.3 amps if not limited by code. This is significantly more than what a typical Arduino UNO can support, as a regular Arduino UNO R3 will cut out with a current draw exceeding 500mA. Therefore, considerations must be taken with regard to powering your project.

NOTE: The simplest way to reduce current draw is by limiting the maximum brightness level in your code.

Power Supply Options

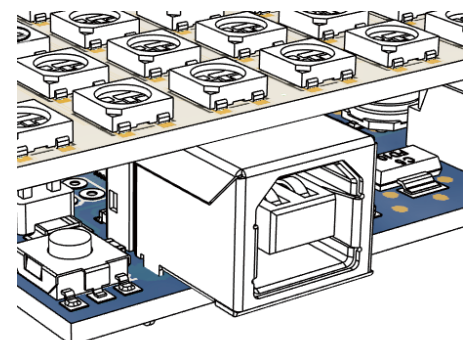
USB C Power Port:

Use a USB C cable and a compatible USB power supply capable of delivering over 2 amps to power the shield via the onboard USB C port. This port not only powers the matrix but also provides power to the Arduino UNO when connected.



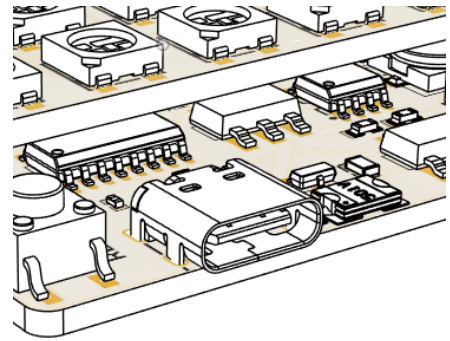
Arduino UNO Power:

You can power the Glow UNO shield directly through the Arduino UNO board. However, ensure that the Arduino UNO can supply sufficient current to both the shield and any connected peripherals. Note that a typical Arduino UNO R3 board can only deliver up to around 500 mA, which may not be sufficient for some projects. Therefore, this method may not be the best option.



amomii UNO Power:

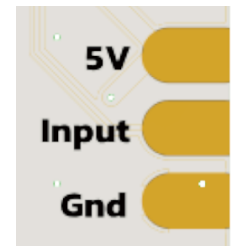
Some microcontrollers, such as the amomii UNO, are built to withstand a greater power draw than the original Arduino UNO and are, therefore, more suitable for powering more current-demanding projects such as LED matrices. However, precaution must still be practiced.



5V and GND Pads:

For additional flexibility, solder wires to the 5V and GND pads on the back of the Glow UNO shield to connect to an external power source.

For optimal performance and to prevent overloading the Arduino UNO, it is not recommended to use the Arduino UNO Power method for extended periods, or at all, unless precautions are taken in the code to prevent high current draws.



Coding

To control the Glow UNO, a variety of controllers can be used with different coding languages and IDEs. However, we recommend using a microcontroller compatible with the Arduino IDE and the FastLED coding library for ease of use.

The FastLED library, originally created by Daniel Garcia and Mark Kriegsman, is a comprehensive function pack coding library that simplifies programming the Glow UNO. The library includes example code that can produce impressive light patterns on your board, requiring little modification to the code.

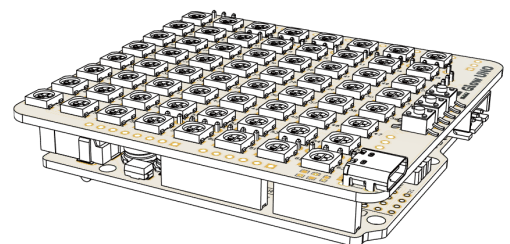
For more information, refer to our [Getting Started document](#). 

Modes

UNO Mode

The Glow UNO was designed to function both as a shield for Arduino UNO type boards and as a standalone RGB matrix that can be wired to various controllers.

When used in UNO Mode, the Glow UNO directly attaches to an Arduino UNO board, leveraging the board's pin headers for seamless integration. This setup allows users to easily control the 8x8 WS2812B RGB matrix and the built-in push buttons without complex wiring.

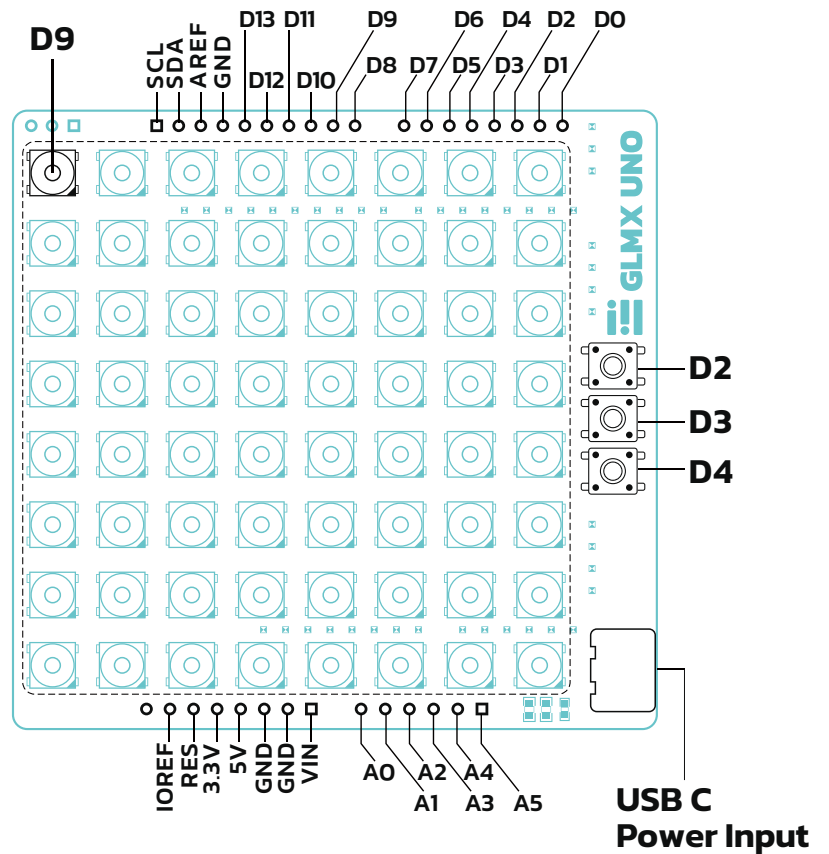


UNO Mode Pinout

In UNO Mode, the Glow UNO connects to the Arduino UNO using the following pins:

- D2: Button 1 (SW1)
- D3: Button 2 (SW2)
- D4: Button 3 (SW3)
- D9: Data input for the LED matrix

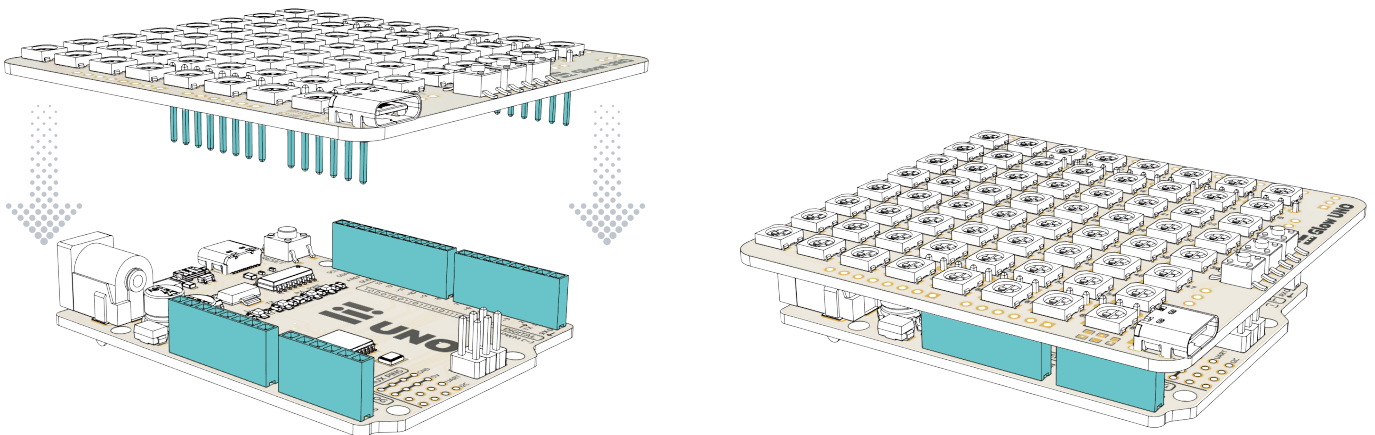
All of the UNO pins can be accessed for the solder pads at the top and bottom of the panel, and there is also a PD compatible USB C power port.



Connection

To connect the Glow UNO to an Arduino UNO type board:

1. Align the Glow UNO shield's pin headers with the corresponding headers on the UNO.
2. Press the shields together firmly to ensure a secure connection.



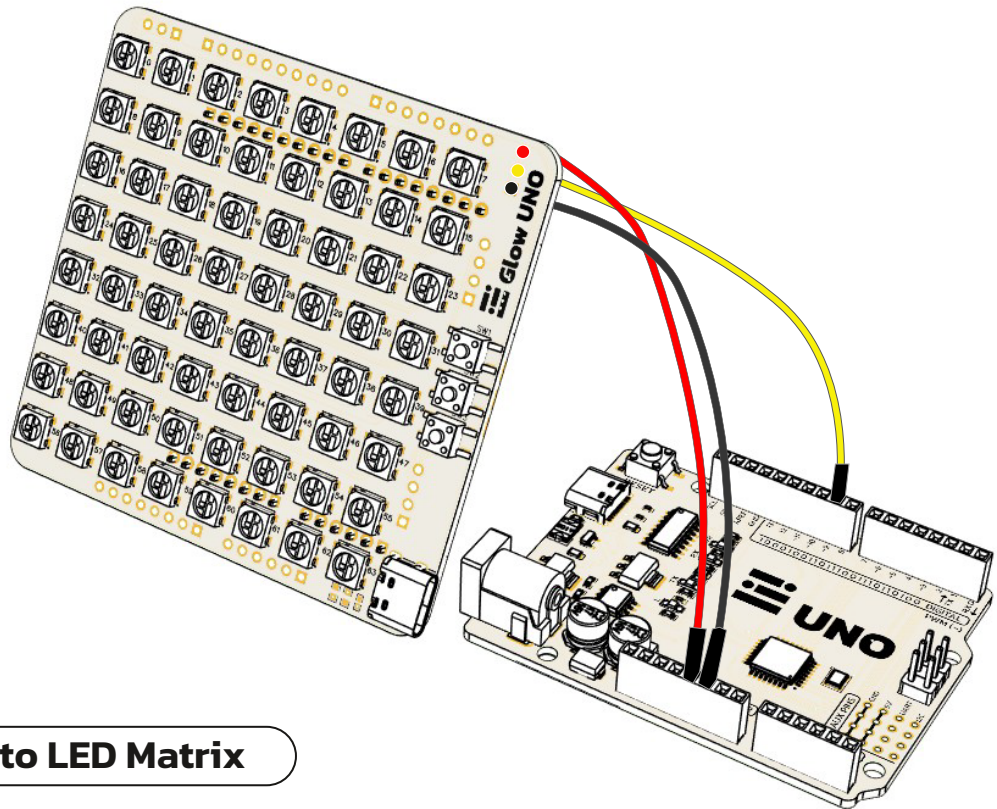
Once connected, the Glow UNO can be powered through the UNO or via the onboard USB C power port. For optimal performance, especially when driving a large number of LEDs at high brightness levels, it is recommended to use an external 5V power supply through the PD compatible USB C port on the shield. Using this port will also power the UNO board.

Using the Buttons

The Glow UNO shield features three built-in push buttons for easy interactive control. These buttons are pre-wired and directly accessible when connected to your UNO board. They are connected to the UNO pins D2, D3, and D4 and should be configured as INPUT_PULLUP in your Arduino sketch to read button presses effectively, meaning they will read as HIGH when not pressed and LOW when pressed. See the Buttons and Connectors section for more on the circuitry.

Standalone Mode

The Glow UNO is also designed to function as a standalone RGB matrix that can be wired to various controllers such as ESP8266, ESP32, Raspberry Pi, and other Arduino boards. When used in Standalone Mode, the Glow UNO provides flexibility in controlling the 8x8 WS2812B RGB matrix and built-in push buttons, offering versatile integration options for a wide range of projects.

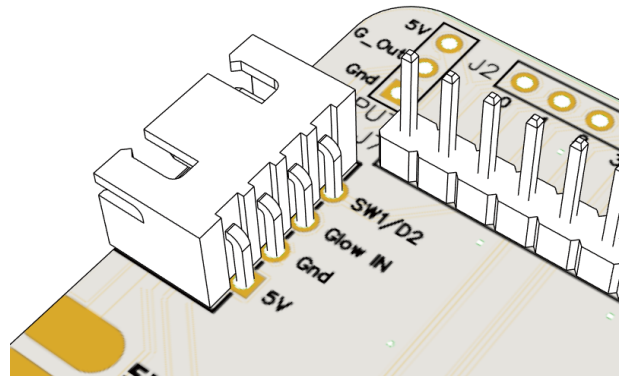


Connection to LED Matrix

Since the LED matrix uses WS2812B pixels, each pixel can be individually controlled via a single data pin, making it easy to connect to various controllers. To do this, ensure the matrix's data pin is connected to the desired GPIO pin on the microcontroller, the 5V pin on the matrix is connected to an adequate power supply, and that a common ground is shared between the microcontroller and the matrix. The power supply for the controller and the matrix can be separate or shared. Several methods can be used to connect the matrix to the controller, including the following:

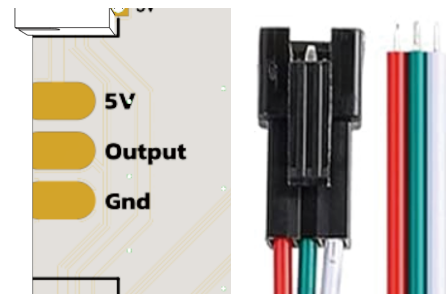
XH Connector

Solder the provided XH connector to the bottom of the Glow UNO at position XH2. Use a compatible XH wire to connect the shield to your microcontroller. As you can see, a 4 pin XH connector is used even though only 3 pins are required for the matrix, the fourth pin allows access to button SW1. An alternative connector could be used here if desired.



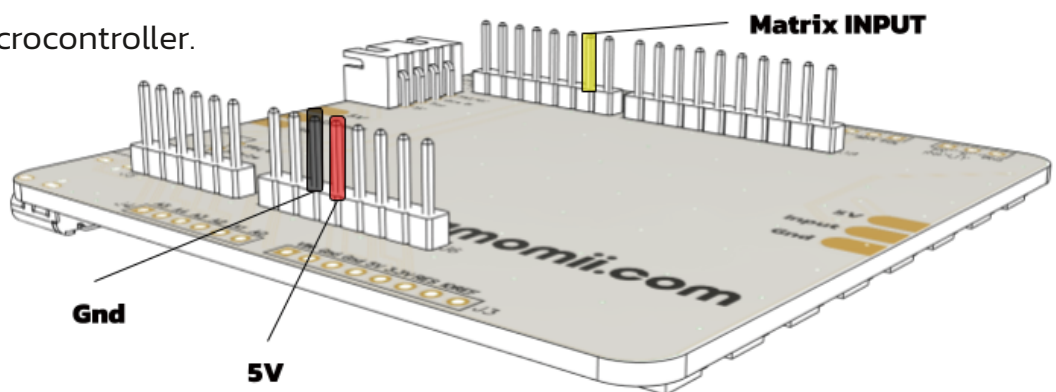
Solder Pads

Solder your preferred connector type to the commonly used JST connectors pictured below.

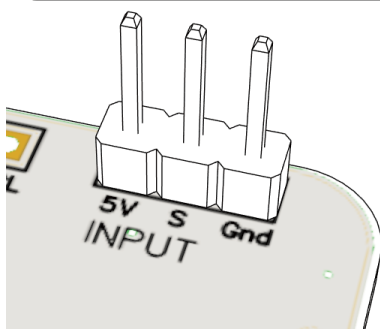


UNO Headers

Use jumper wires to connect the pre-soldered pins intended for UNO Mode to your microcontroller.



Additional Header Spots



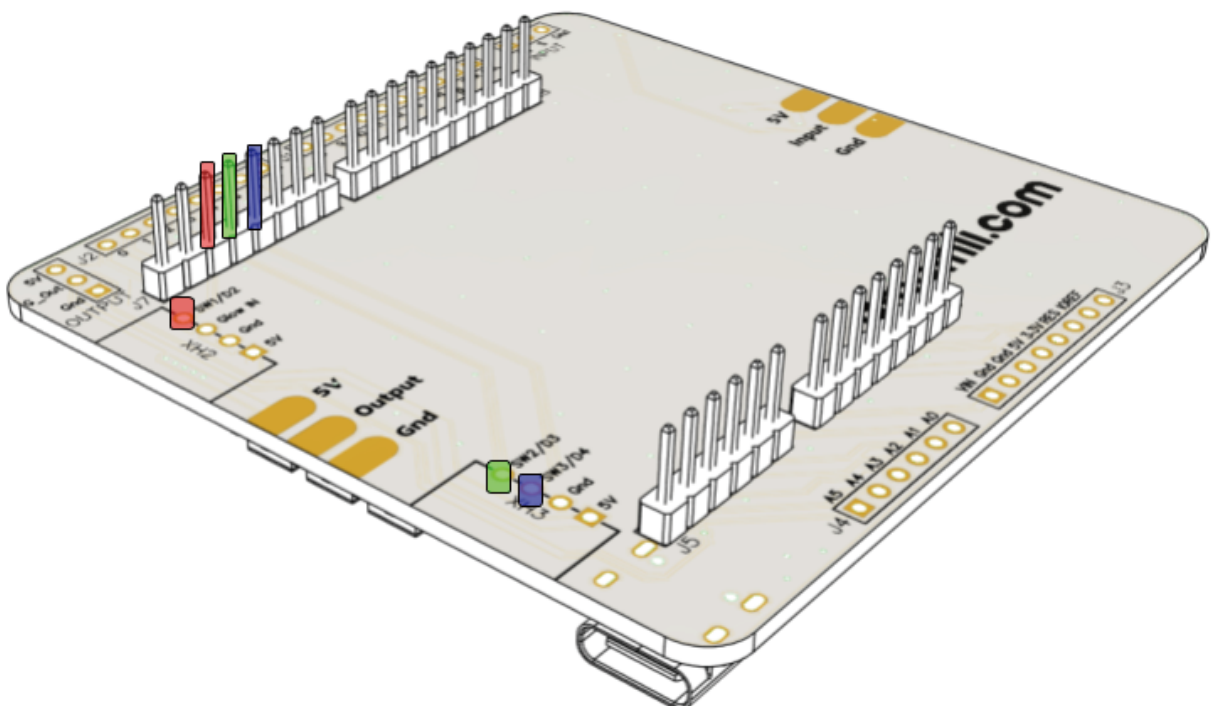
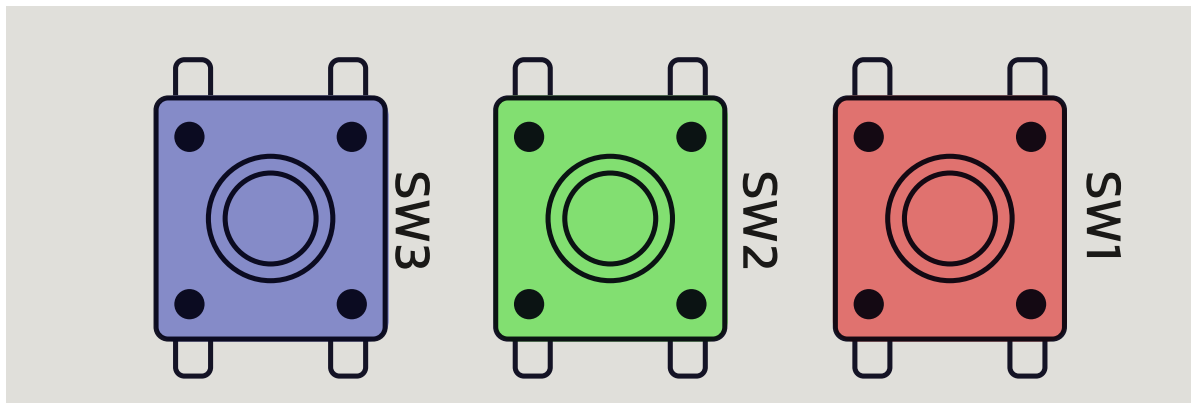
Snap 3 pins from the provided 40-pin strip, solder them in place and connect to your microcontroller with jumper wires.

Take Note

Ensure all connections are secure and double-check the polarity to prevent damage. Sharing a common ground (GND) between the controller and the Glow UNO is essential for proper operation.

Buttons and Connectors

Each button (SW1 - SW3) is connected to ground on one side and to data pins on the other side. Pressing a button essentially connects a data pin to ground. Therefore, the buttons can be used with any microcontroller but must be set as INPUT_PULLUPs unless external pull-up resistors are used. The following diagrams show which pins are connected to ground when the buttons are pressed. We will use red, green, and blue labels to distinguish between SW1, SW2, and SW3, respectively.



Connecting Multiple Glow UNO Panels

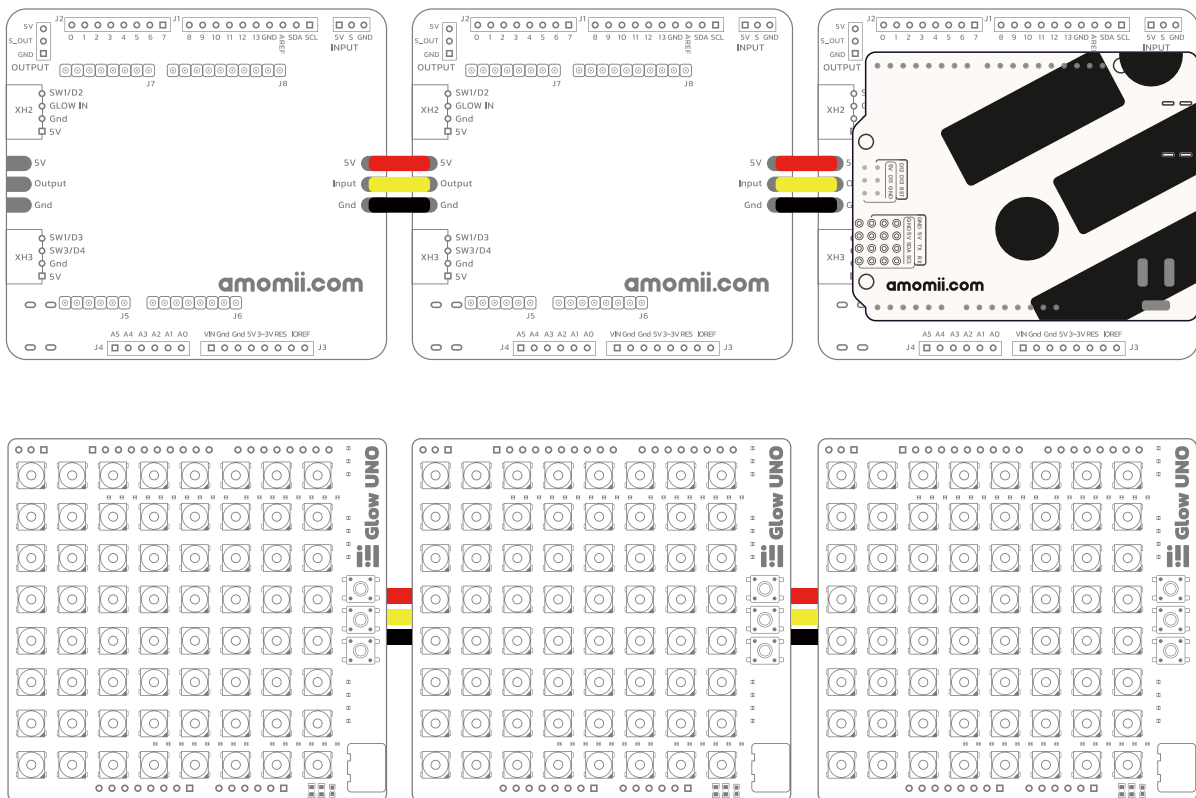
In both UNO Mode and Standalone Mode, multiple Glow UNO panels can be connected to create larger displays. There are various methods to achieve this, but it's crucial to consider power consumption and microcontroller memory limitations before proceeding.

Each Glow UNO panel consists of 64 pixels, and each pixel can potentially draw up to 36 mA of current. For instance, connecting four panels could potentially draw over 9 amps in total. In practice, it is unlikely that all LEDs will be operating at maximum brightness simultaneously; nonetheless, it is essential to use sufficient power solutions to handle potential peak currents.

Additionally, consider the memory capabilities of your microcontroller. Since each pixel is individually addressable, increasing the number of panels also increases the memory requirements for storing the LED data.

Careful planning and adequate power management will ensure reliable operation when connecting multiple Glow UNO panels for larger displays.

For the most reliable connection, it is recommended to use the solder pads on the bottom of the Glow UNO.



In this example, three panels have been connected together, with the leftmost panel (when looking from the top) connected directly to the UNO board. In this setup, the project could be powered by any of the USB C ports, though the rightmost port would be the most practical. It could also be powered by soldering an external source to any of the 5V and Gnd solder pads on the bottom.

Revision History

Date	Revision	Changes
July. 01. 2024	1	First release



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