

Neon Tennis

Getting Started Guide Book

Experience the thrill of Neon Tennis, an original, interactive Arduino-compatible game shield while mastering soldering, coding, and electronics!

amomii



Caution

The completion of the Neon Tennis shield requires soldering, a process that if done incorrectly can be dangerous, and components that can overheat (see point 11). To ensure your safety, please follow these guidelines:

- 1. Maintain a Clean Workspace:** Set up a clutter-free and well-ventilated area for soldering. Clear away any unnecessary items to minimize distractions and potential hazards.
- 2. Handle with Care:** Treat soldering equipment and materials with care and respect. Avoid rough handling or dropping of components to prevent damage or injury.
- 3. Supervision for Minors:** If you are under the legal consent age, it is crucial to have proper supervision from a knowledgeable adult while soldering. This ensures proper guidance and minimizes potential risks.
- 4. Protective Eyewear:** Wear safety goggles or protective eyewear at all times during soldering. These will shield your eyes from any splashes, sparks, or accidental contact with heated components.
- 5. Appropriate Attire:** Dress in appropriate clothing for soldering, preferably made from natural fibers, to minimize the risk of loose clothing catching fire or interfering with your workspace.
- 6. Proper Ventilation:** Ensure adequate ventilation by working in a well-ventilated area or using a fume extractor. Soldering fumes may contain potentially harmful substances, and proper ventilation helps mitigate their impact.
- 7. Burn Prevention:** Be cautious of hot soldering irons and components. Always place the soldering iron in its holder when not in use, and handle it with the utmost care to prevent burns.
- 8. Flux and Lead Handling:** Handle soldering flux and lead-based solder with care. Wash your hands thoroughly after soldering to prevent accidental ingestion or skin contact.
- 9. Mindful Placement:** Be mindful of the placement of soldering equipment and components to prevent tripping hazards or accidental contact with hot surfaces.
- 10. Emergency Preparedness:** Familiarize yourself with the location of fire extinguishers and first aid kits in your workspace. In case of any mishaps, you should be prepared to respond promptly.
- 11. Shift Register Precautions:** The official Neon Tennis code is designed to ensure that only one LED is lit at a time per shift register. This prevents the shift register from overheating, which can potentially cause damage and pose a burn hazard. If you use incorrect code that allows multiple LEDs to shine simultaneously on a single shift register, it can lead to these risks. You are welcome to use your own code, but please ensure it is designed to operate safely.

By adhering to these safety guidelines, you ensure a secure and enjoyable soldering experience while assembling the Neon Tennis shield. Your safety is of utmost importance to us, and we want you to confidently pursue your creative endeavors while taking every precaution necessary.

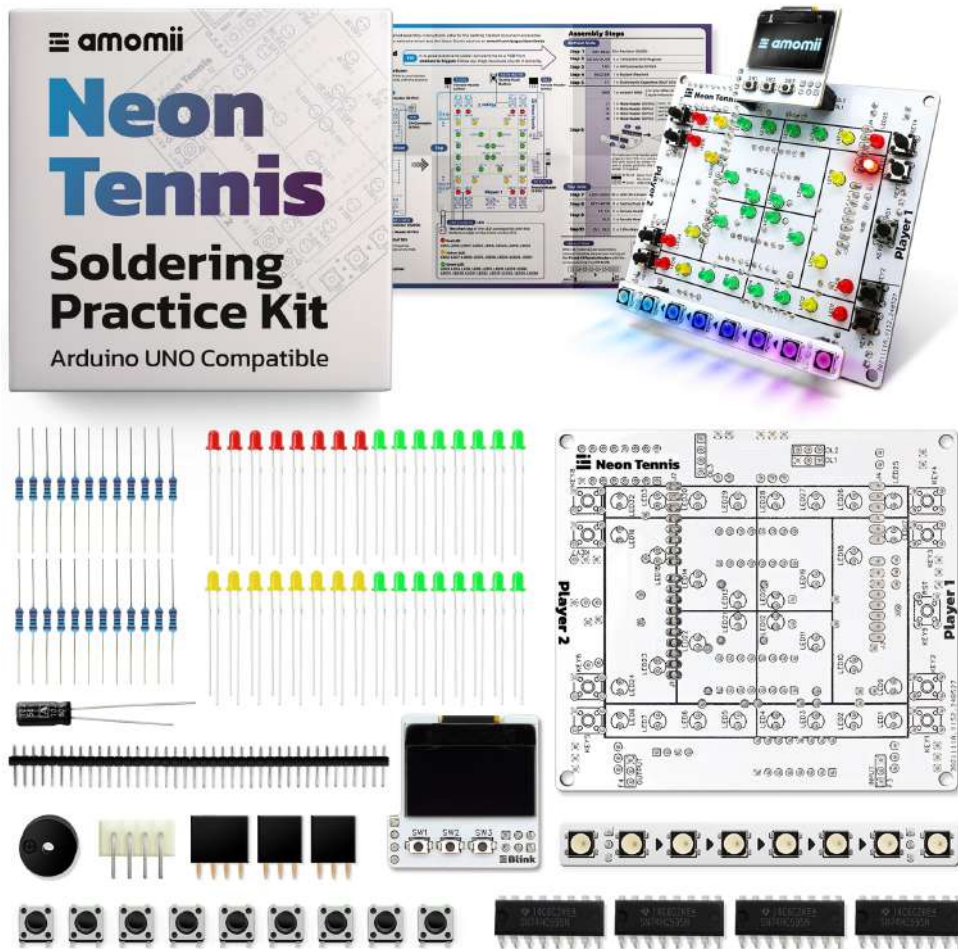


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Introduction



Welcome to the amomii Neon Tennis Getting Started Guide! Neon Tennis is an Arduino-compatible game shield designed to bring the excitement of tennis to your fingertips. This interactive two-player game features 32 LEDs arranged in specific lines to simulate a tennis court, an OLED screen for displaying animations, scores, and game status, and an RGB strip for visualizing serve power. Whether you're a seasoned maker or just beginning your journey into electronics and programming, Neon Tennis offers an engaging and educational experience that combines the fun of gaming with the thrill of hands-on learning. In this guide, you will find everything you need to set up, code, and play Neon Tennis. Let's get started!

Neon Tennis Electronic Materials



Headers

Female headers (3 Pin & 4 Pin) and male headers (40 Pin) are connectors used to make electrical connections between components. On the Neon Tennis shield, they enable easy plug-and-play connectivity between the shield and other components, such as the amomii UNO or other shields.



Tactile Push Button

A momentary switch that allows you to create user input interfaces in electronic projects. On the Neon Tennis shield, these buttons are used for player input, allowing players to interact with the game by simulating the hitting of a tennis ball.



LED

Light Emitting Diodes (LEDs) emit light when powered and are commonly used for indicator lights in electronic projects. On the Neon Tennis shield, LEDs are used to display the tennis court, lighting up to represent the position of the ball and creating a dynamic visual effect.



74HC595N Shift Register

An 8-bit shift register that allows control of multiple LEDs with fewer microcontroller pins. On the Neon Tennis shield, these shift registers manage the 32 LEDs using only three Arduino UNO pins per pair, enabling efficient and complex LED control.

Buzzer (Passive)

An audio signaling device that produces sound when an electrical signal is applied to it. On the Neon Tennis shield, the buzzer produces sound alerts for various game actions, such as scoring points or signaling the end of a match.



Resistors

Passive components that limit the flow of electrical current in a circuit. On the Neon Tennis shield, resistors (220Ω) are used to limit the current flowing through the LEDs and other components, protecting them from damage.



XH Connector (4 Pin)

A 4-pin connector used for making secure and reliable electrical connections. On the Neon Tennis shield, the XH connector is used for connecting the shield to the amomii Glow UNO, an optional addition sold separately, enabling additional lighting effects and customization options.



Capacitors

Passive electronic components that store and release electrical energy, often used for filtering and smoothing voltage. On the Neon Tennis shield, capacitors are used for filtering and smoothing voltage, ensuring stable operation and reducing electrical noise.



amomii Blink

An OLED screen module used for displaying information and animations. On the Neon Tennis shield, the amomii Blink module displays animations, scores, and game status, providing players with visual feedback and game information.



amomii Glow

The amomii Glow is an addressable RGB light strip consisting of WS2812B pixels that can be individually programmed to show various colors and brightness levels. In Neon Tennis, it visualizes serve power and adds dynamic lighting effects, enhancing the overall gaming experience.



For more details, see the [amomii Glow section at amomii.com/pages/downloads](https://amomii.com/pages/downloads).

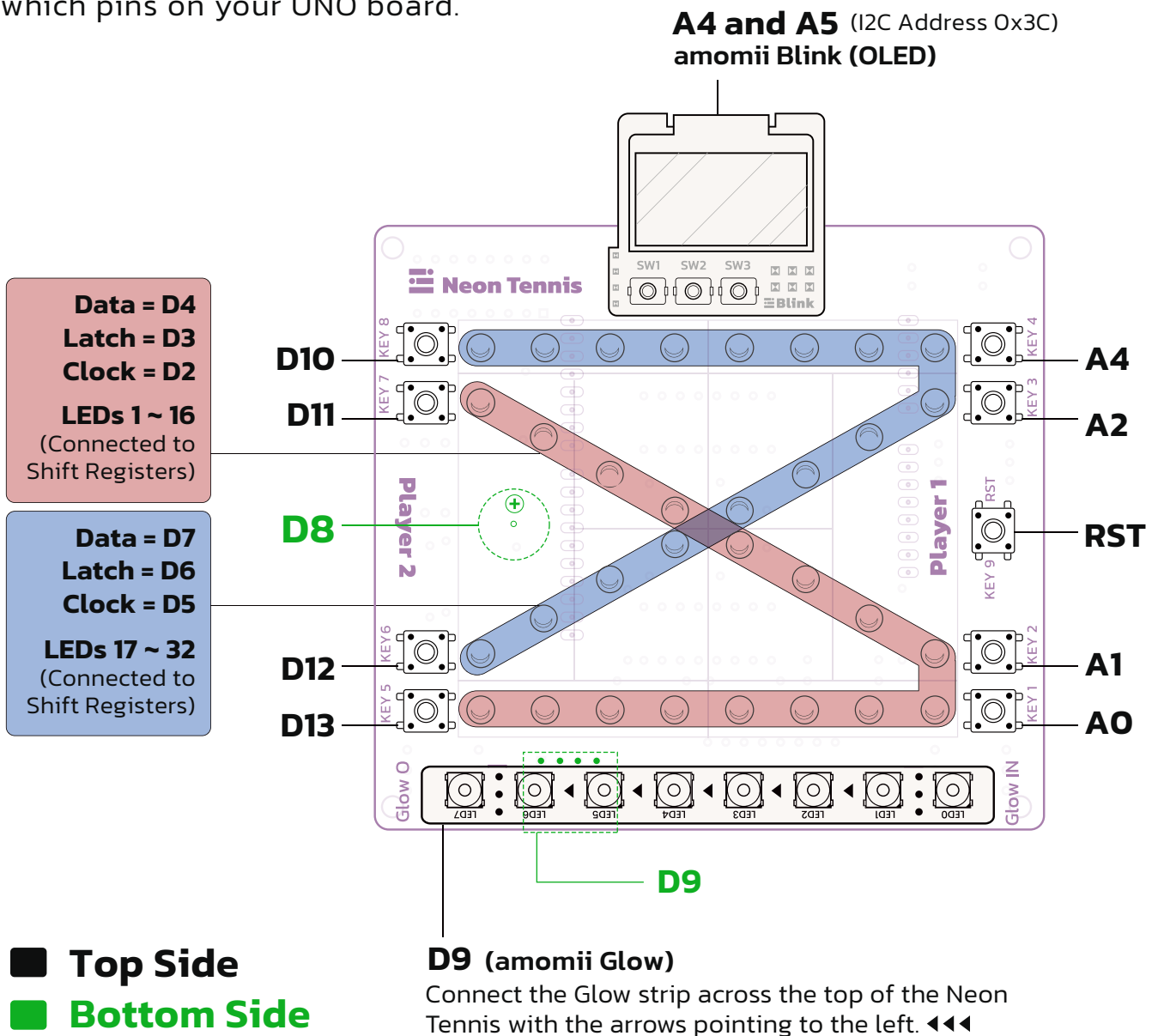
Neon Tennis Active Component Diagram

This diagram highlights the placement of all active components on the Neon Tennis shield. It provides vital information, including the corresponding pin connections to your amomii UNO and additional information beneath the diagram.

Active components, in this context, refer to components that actively engage with your microcontroller, such as input and output devices. For details on passive components like resistors and capacitors, please consult the Soldering section of this manual.

Neon Tennis Pinout

Refer to this diagram to know which components connect to which pins on your UNO board.





Solder the Shield

Prepare your soldering tools



Solder Wire

Soldering Iron

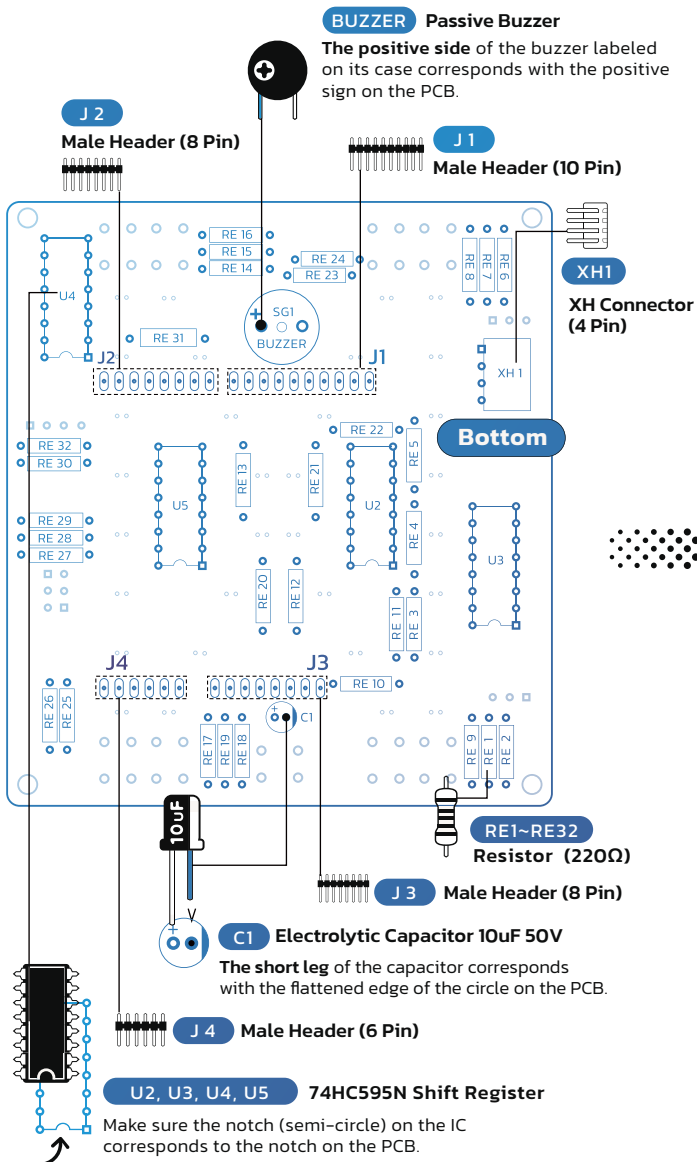
Wire Cutters

Goggles

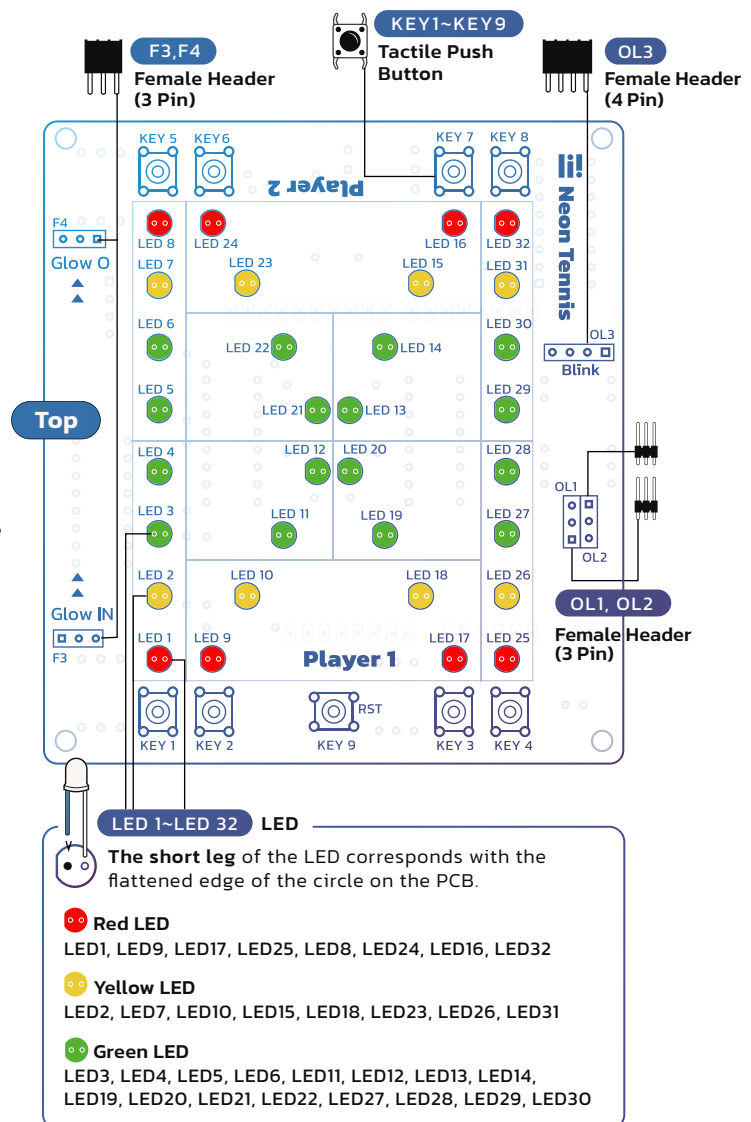
Blu Tack

Thick Cardboard

Bottom Side

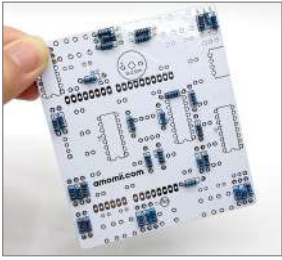


Top Side



Step 1

32 x Resistor (220Ω) → RE1 ~ RE32

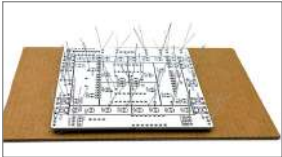


Put all of the resistors in place. Make sure you use the correct resistor by referring to the Materials Diagram on page 1.

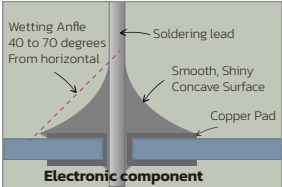
Top Tip: It may be helpful to bend the resistors into U shapes and insert both legs at the same time.



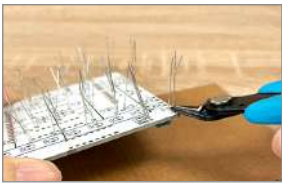
Place a piece of cardboard on top of the resistors to stop them from falling out when you turn over the PCB.



With the PCB lying flat on your table and the resistor legs sticking up towards you, solder each joint, one by one.



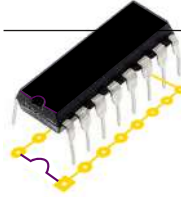
When soldering, make sure that the tip of your soldering iron touches and heats up both the leg of the resistor and the solder pad before introducing the solder wire. A properly soldered joint should have a cone shape from the pad to the leg.



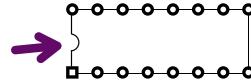
Utilize wire cutters to trim the excess legs off the resistors. Please be aware that the cut-off legs may project forcefully, posing potential hazards. Exercise caution by wearing protective goggles to ensure your safety.

Step 2

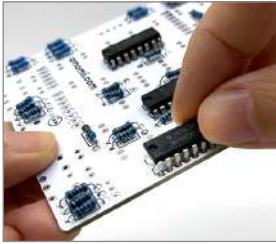
4 x 74HC595N Shift Register → U2, U3, U4, U5,



Place the Shift Register in position, turn over the PCB, and solder each leg one by one. Pay careful attention not to bridge any of the legs (make sure none of the legs get soldered together).



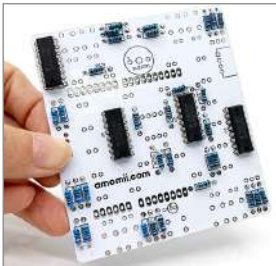
Note: The semicircular notch on the Shift Register needs to correspond to the semicircular notch on the PCB.



Place the Shift Register in the correct orientation.



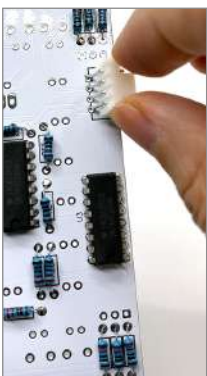
Solder the legs in place.



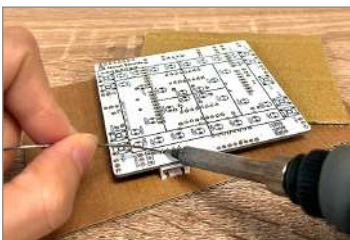
Final result after soldering all Shift Registers.

Step 3

1 x 4P XH Connector → XH1

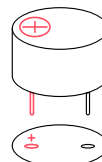
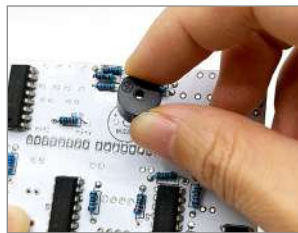


Place the XH Connector in position, turn over the PCB, and solder each leg one by one. Pay careful attention not to bridge any of the legs (make sure none of the legs get soldered together).



Step 4

1 x Buzzer (Passive) → BUZZER1

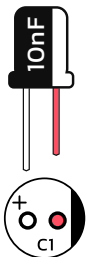
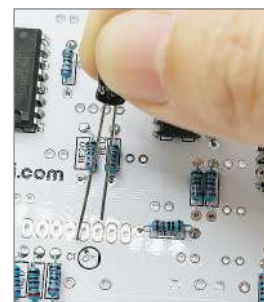


Connect the passive buzzer to the shield. Be sure that the positive sign on the buzzer corresponds with the positive sign on the buzzer symbol on the PCB. Turn it over and solder it in place.

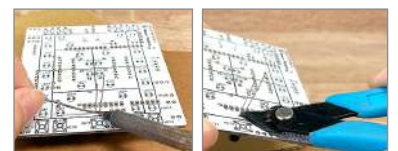


Step 5

1 x Capacitor (10nF) → C1



Please note that when installing the 10nF capacitors, the short leg must correspond to the blacked-out section of the capacitor symbol on the PCB. When in place, turn over the PCB, solder the legs, and cut off the excess.

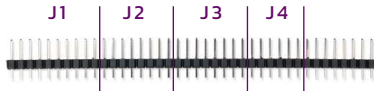


Step 6

1 X amomii UNO
(or any other Arduino UNO style
microcontroller)

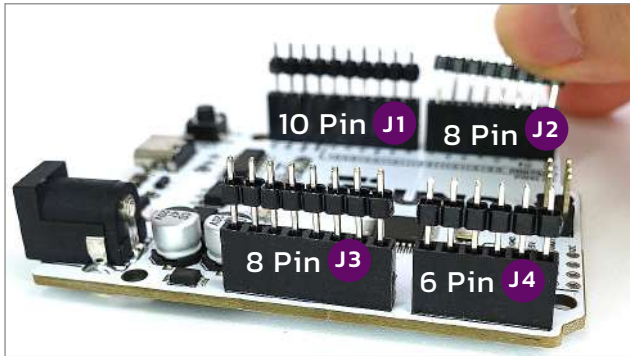


10 Pin-Male Headers → J1
8 Pin-Male Headers → J2
6 Pin-Male Headers → J3
6 Pin-Male Headers → J4



Snap the 40-pin header strip into four sections to create J1~J4 and leave 6 pins for step 10.

Push the long side of the header pins into the UNO ports as shown in the picture.



Push the long side of the header pins into the UNO ports as shown in the picture. Make sure that the long legs are firmly inserted into the UNO ports with the short pins sticking up.



Next, place the Neon Tennis shield on top so that the short header pins protrude through the board and stick out of the top of the PCB. It is often easier to push one side through first and then the other, using the first side as a hinge of sorts.



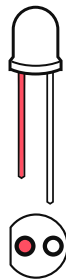
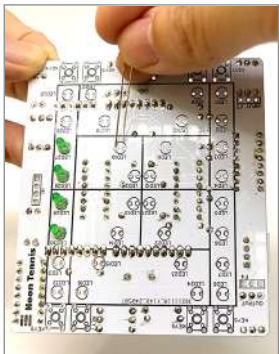
Solder the pins to the top of the Neon Tennis PCB, creating your Neon Tennis shield.



Remove the Neon Tennis shield from the UNO. When you pull the two apart, the header pins should stay connected to the Neon Tennis shield and come out of the UNO ports.

Step 7

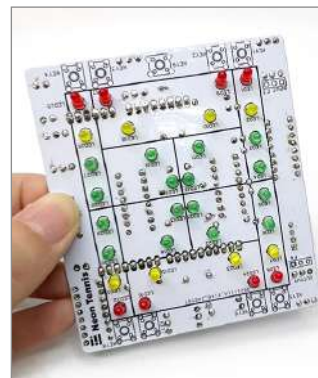
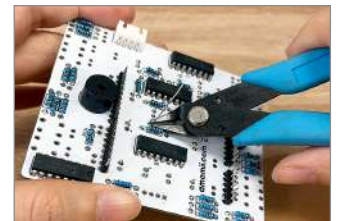
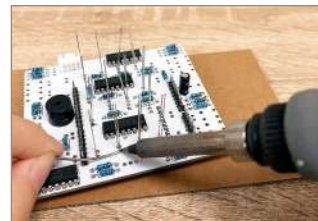
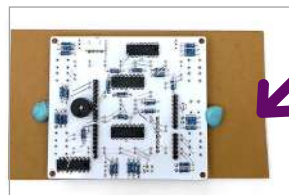
16 x LED (Red) → LED (1, 8, 9, 16, 17, 24, 25, 32)
8 x LED (Yellow) → LED (2, 7, 10, 15, 18, 23, 26, 31)
8 x LED (Green) → LED (3, 4, 5, 6, 11, 12, 13, 14, 19, 20, 21, 22, 27, 28, 29, 30)



Insert the LEDs into the shield.

Note: LEDs are polarized, meaning that if they are not connected correctly, they will not work. Make sure the shortest leg (cathode) corresponds to the flat edge of the circular LED symbol.

Make sure that the red, yellow, and green LEDs are placed in their corresponding spots.



What it should look like after all the LEDs are soldered on.

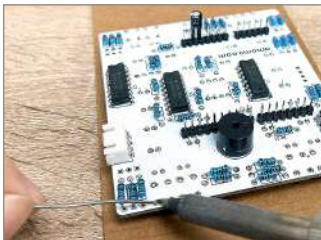
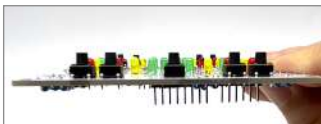
Step 8

9 x Tactile Push Button → KEY1~ KEY9



Install the 9 Tactile Push Buttons on the PCB panel

Up until now, slight alignment issues would only be an aesthetic problem. However, if the push buttons are not flat, it could affect performance, so make sure they are all even and flat before proceeding to solder them in place.



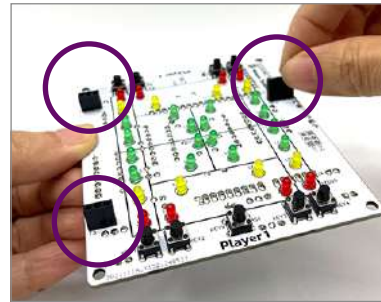
Solder the legs in place.

Step 9

2 x Female Headers (3 Pin) → F3, F4

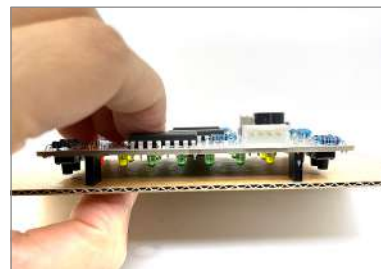


1 x Female Headers (4 Pin) → OL3



Install the 3-pin female headers into the positions marked F3 and F4 on the PCB. Ensure they are fully seated and flat against the PCB surface.

Install the 4-pin female header into the position marked OL3 on the PCB. Ensure it is also fully seated and flat against the PCB surface.



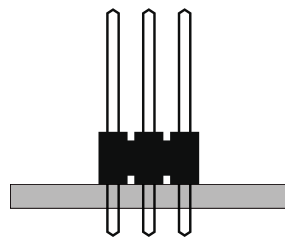
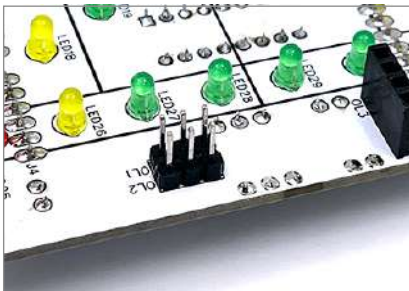
Solder all the pins of the female headers to secure them in place.

Step 10

2 x 3Pin-Male Headers → OL1, OL2



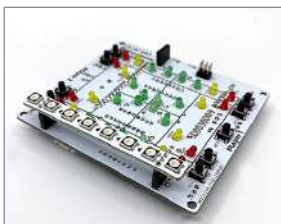
Snap the pin header strip into 2 sections to create OL1 and OL2.



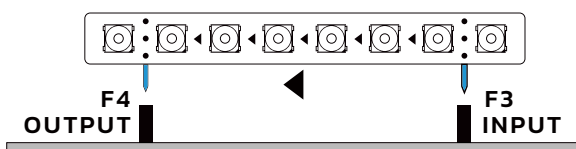
Insert the short side of the pin headers into the positions marked OL1 and OL2 on the PCB, with the short side protruding through the PCB.

Solder the pins in place to secure them.

amomii Glow



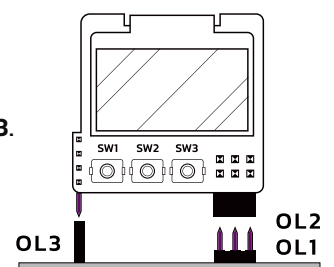
When all materials are assembled, connect the Glow strip across the top of the F3 and F4 Female Headers with the arrows pointing from F3 to F4.



amomii Blink



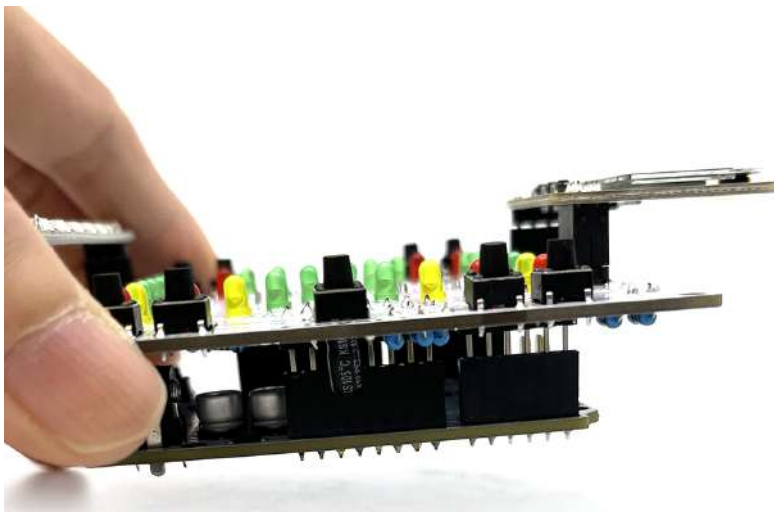
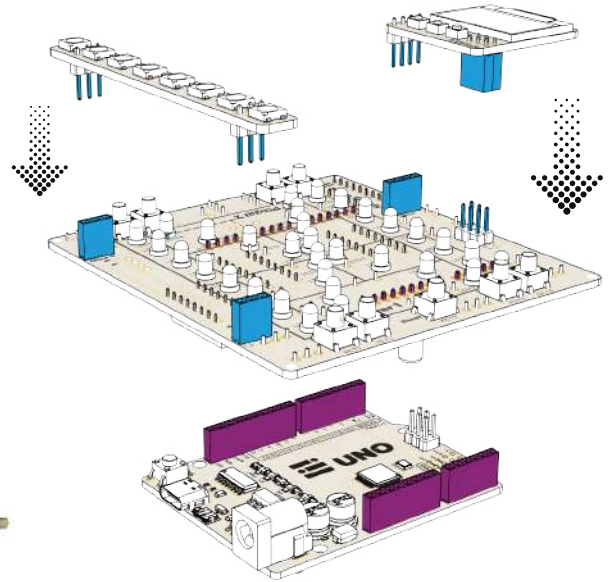
Connect the amomii Blink to the shield at OL1, OL2, and OL3.





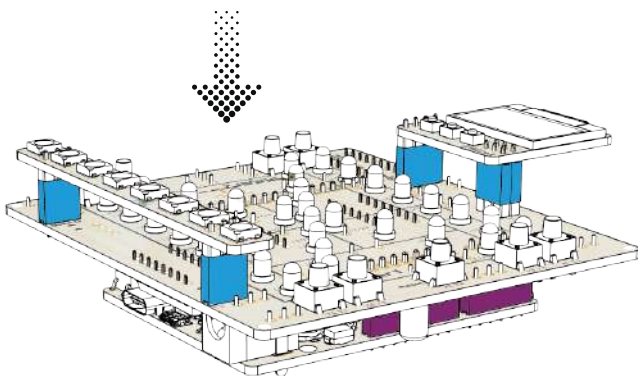
Get Connected

To connect, simply insert the male header pins protruding from the bottom of the Neon Tennis shield into the female header pins on the top of the UNO. Make sure that all pins are inserted correctly and be sure to push the Neon Tennis shield firmly in place.



If you have not already, connect the amomii Glow strip across the top of the F3 and F4 Female Headers with the arrows pointing from F3 to F4.

Finally, connect the amomii Blink to the shield at OL1, OL2, and OL3, ensuring it is firmly in place.





Code it to Life

Before you start uploading code to your Neon Tennis shield, you will need to download the Arduino IDE and ensure you are able to use it to upload code to your UNO board.

If you already have the Arduino IDE and know your UNO board is working, you can proceed to the Coding Libraries section.

Download the Arduino IDE

The Arduino Integrated Development Environment (IDE) is the software used to write, upload, and debug sketches (programs) on your microcontroller (the amomii UNO, for example).

The IDE can be downloaded for free from the Arduino website (www.arduino.cc). The IDE is available for Windows, Mac OS X, and Linux operating systems. Simply go to the "Software" section of the Arduino website, select the appropriate operating system, and follow the instructions for downloading and installing the IDE on your computer.

Testing your microcontroller

If you bought an amomii UNO with this project and have not yet tested it, I suggest that you do this first. Please refer to the [amomii UNO Getting Started](#) guide before proceeding beyond this point and come back when the amomii UNO is tested.

If you plan on using any other UNO board, such as the Arduino UNO, please ensure it is working correctly before proceeding beyond this point.

Coding Libraries

Coding libraries are collections of pre-written code that simplify complex tasks. The Neon Tennis game relies on the FastLED library to control the amomii Glow (addressable RGB LEDs) and the Adafruit_SSD1306 library to control the OLED display. The Adafruit_GFX library, which is required by the Adafruit_SSD1306 library, will be downloaded automatically. While other libraries are available, we use these for their ease of use, extensive documentation, and optimized performance.

Download the Required Libraries

There are various ways to download coding libraries for the Arduino IDE, but the simplest way is to download them directly from within the IDE itself. We will be using Version 2 of the IDE, but the steps for the original are similar.

Click on the **library manager** shortcut on the left-hand side of the IDE.

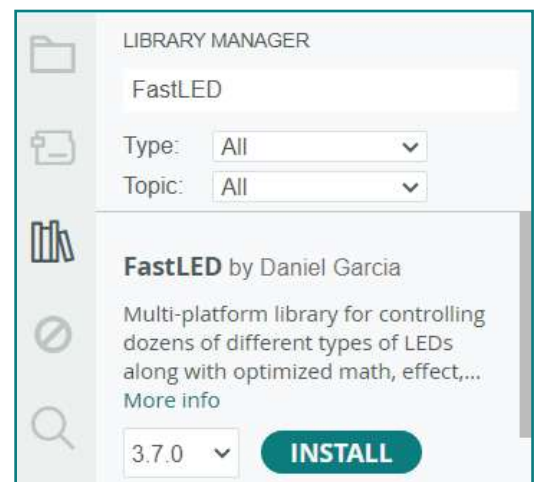


Note: There is no shortcut here on the original Arduino IDE, but the Library Manager can be accessed from **Tools > Manage Libraries**.

When the Library Manager pops up, search for the following libraries and install them:

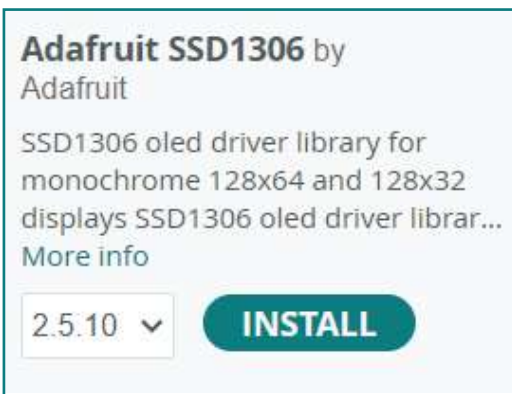
1

FastLED: Search for FastLED and click INSTALL on the version written by Daniel Garcia.

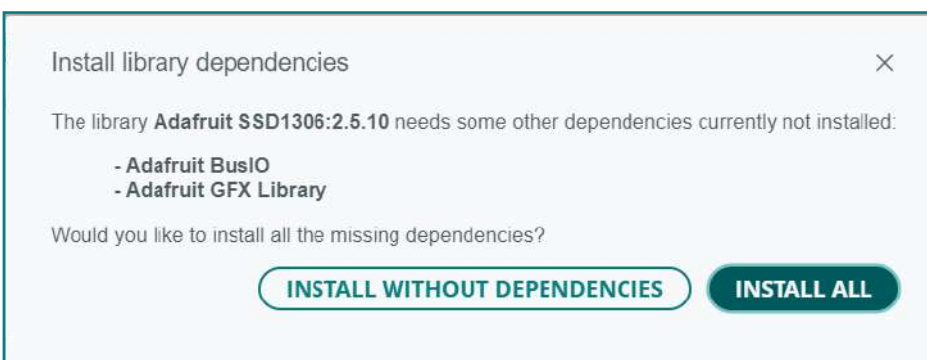


2

Adafruit_SSD1306: Search for Adafruit_SSD1306 and click INSTALL.



When prompted, be sure to click on INSTALL ALL so the Adafruit_GFX library is installed as a dependency.



Test your Neon Tennis

Before you upload the Neon Tennis sketch and start playing your awesome game, it's a good idea to run the test code to ensure all components are working correctly and your soldering job was successful. You can download the official amomii Neon Tennis codes from several sources: it was emailed to you in your welcome email, and you can also access it from the Downloads section at amomii.com.

Welcome email

If you haven't received your Welcome email, scan this QR code or enter the URL into your browser and tell us where to send the email. Your welcomed package includes documentation, guides, code, and more.



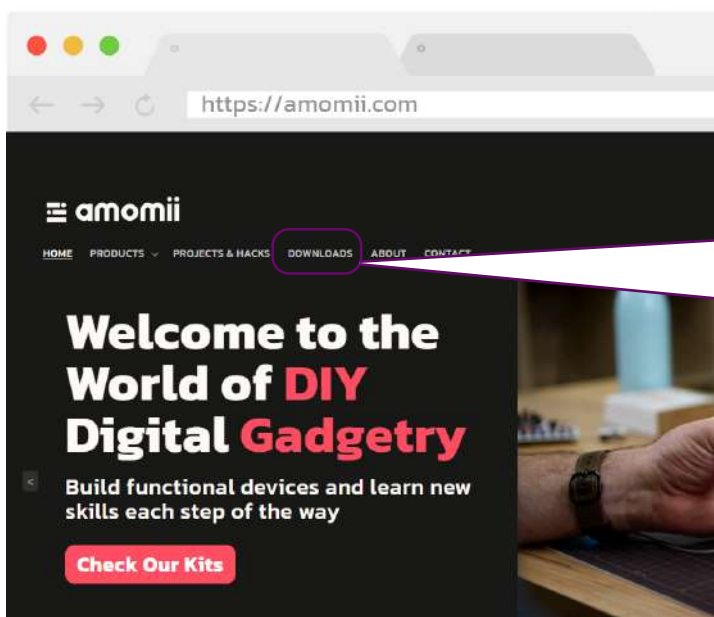
- Example Code
 - Datasheet
 - Getting Started Manual
 - Schematic
 - 3D Printable STLs
- amomii.com/pages/nts_me3se

Downloads Section

To access the code from our website, visit the [Downloads section](#).

NOTE

You will need to create a free account to access this area. Once you are in the **Downloads area**, locate the **Neon Tennis** section and click on the **"Code"** hyperlink. All of the Neon Tennis code should start downloading in a ZIP folder.



Neon Tennis

- Getting Started
- Rules and Gameplay Instructions
- Datasheet
- Schematic
- **Code**
- 3D Printables



Did you receive your welcome email?

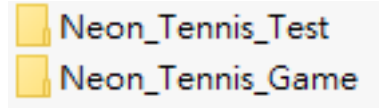
If you bought your Neon Tennis kit from Amazon, click here to receive the welcome email containing all of your digital assets. The hardware is just part of the package, click here to claim the rest.



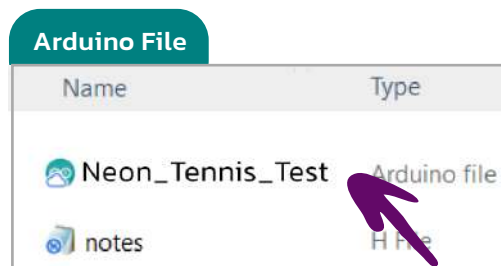
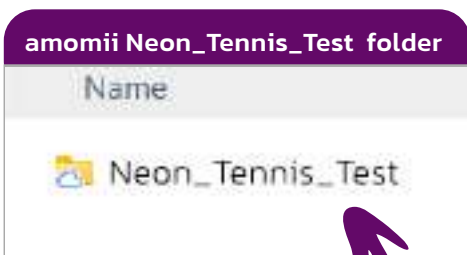
amomii_NT_code

The downloaded ZIP folder is called '**amomii_NT_code**'. Unzip the folder to access the code. It is important not to remove files from the folders as the sketches rely on them and may not work correctly if altered.

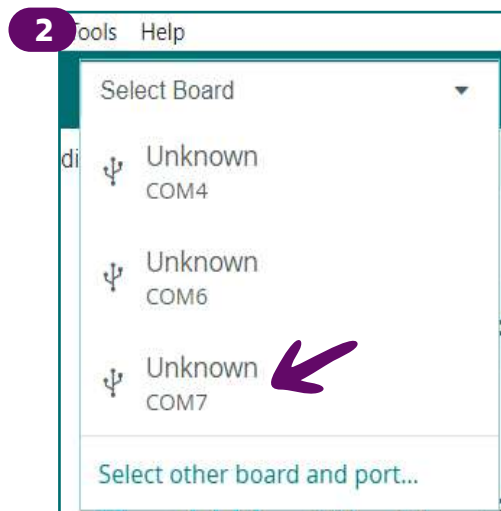
Inside this folder, you will find two more folders: **Neon_Tennis_Game** and **Neon_Tennis_Test**.



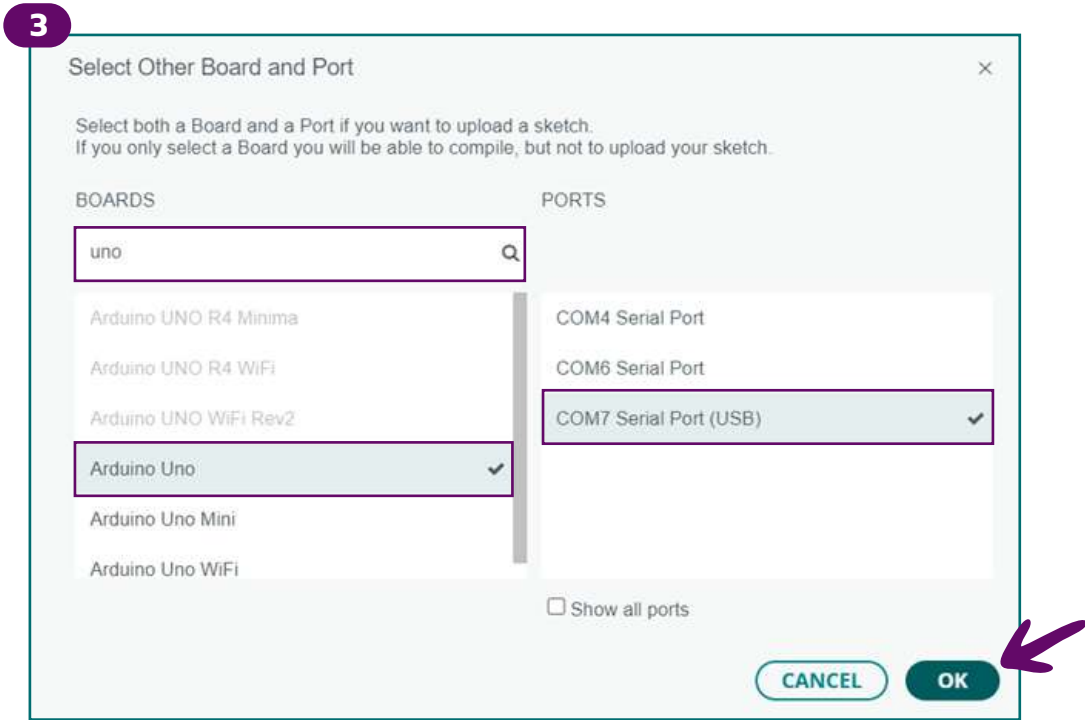
Open the Neon_Tennis_Test folder, then open the Neon_Tennis_Test.ino file. The sketch should open in the Arduino IDE automatically (provided you have installed it).



With your Neon Tennis shield correctly connected to your UNO board, connect the device to your computer.



Select the correct board and COM port, then upload the code.



NOTE

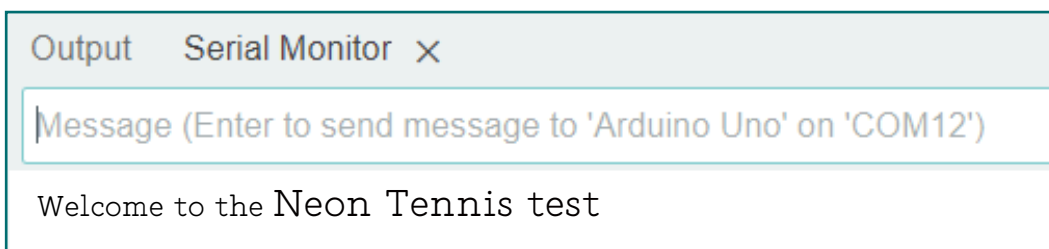
If you haven't installed the libraries and their dependencies as instructed in the Code It To Life section, the code will not upload or work correctly.

Next, you'll need to open the **Serial Monitor**. This tool provides a real-time communication window between your computer and the Arduino board, facilitating project debugging and monitoring.

To open the Serial Monitor, click on the magnifying glass at the top right of the Arduino IDE.



After that, the Serial Monitor will open at the bottom of the IDE.

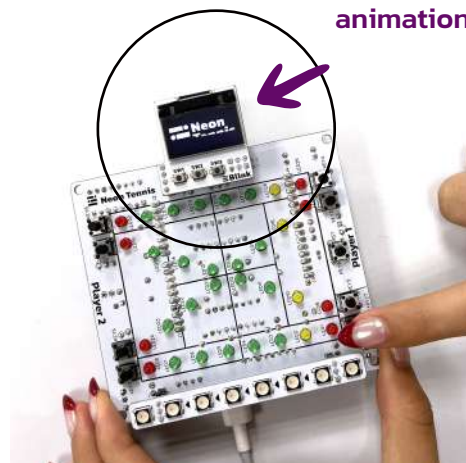
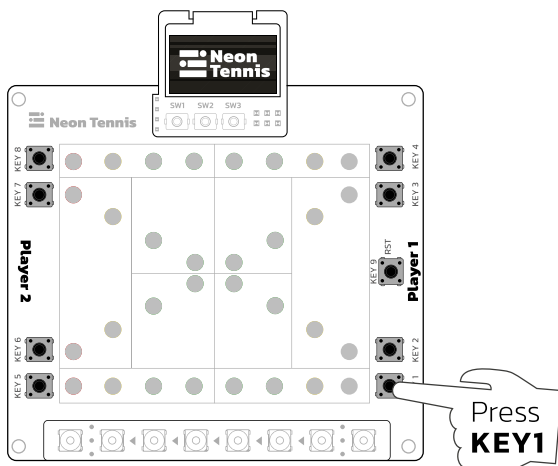


Using the Test Code

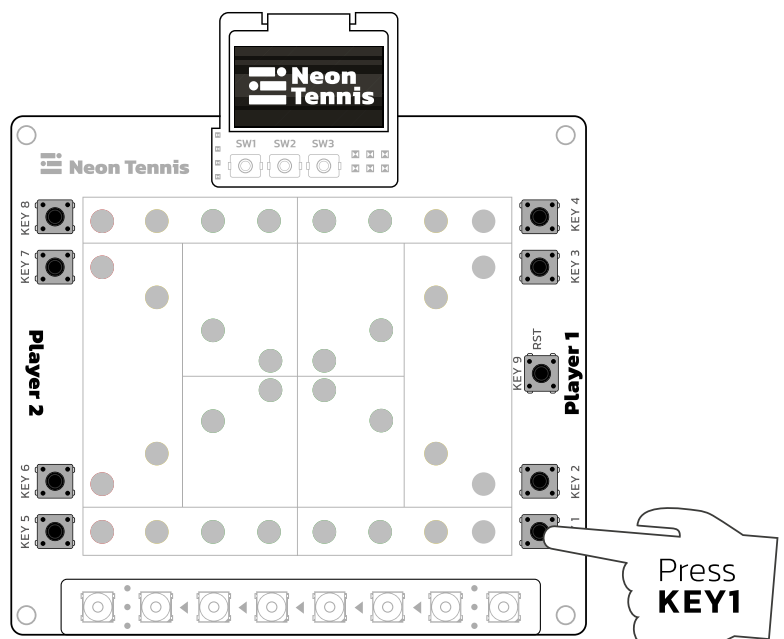
Follow these steps to use the test code:

1. Start the Test

- Open the Serial Monitor in the Arduino IDE.
Select 9600 as the baud rate.
- **Press Key1** to start the test. The OLED screen should display an introductory animation.



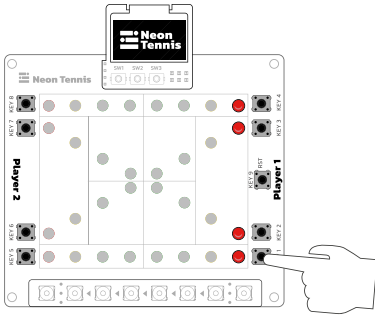
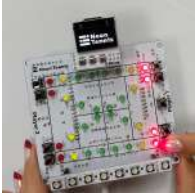
- When prompted by the Serial Monitor, **press Key1**. You should hear a sound signaling the next step.



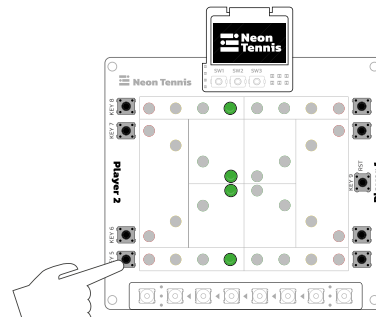
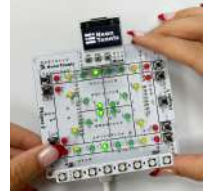
2. Test the LEDs and Buttons

- Follow the instructions displayed on the Serial Monitor to test each button (Key1 to Key8) sequentially.
- When a button is pressed, the corresponding row of LEDs should light up.

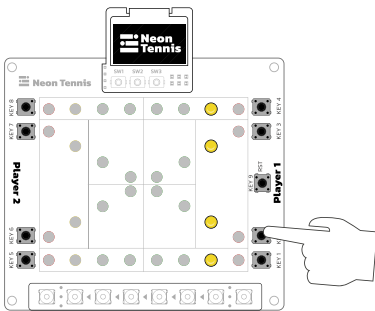
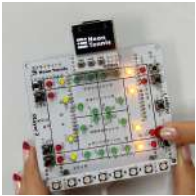
Press **KEY1**



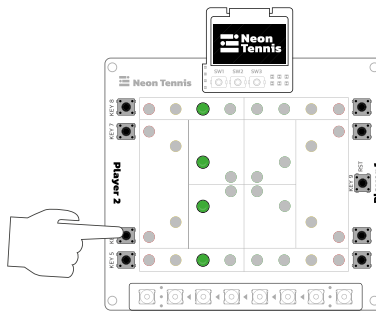
Press **KEY5**



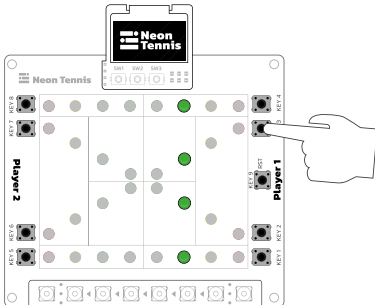
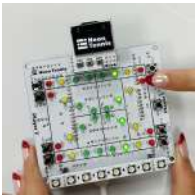
Press **KEY2**



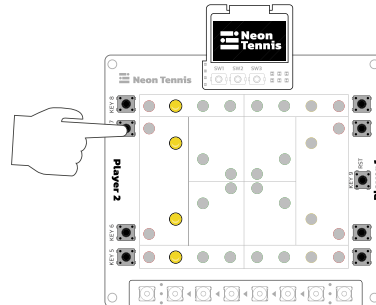
Press **KEY6**



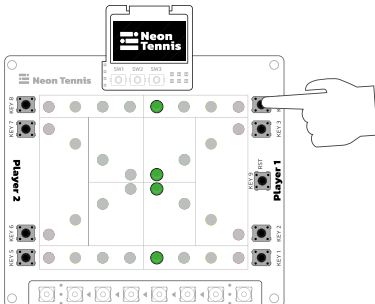
Press **KEY3**



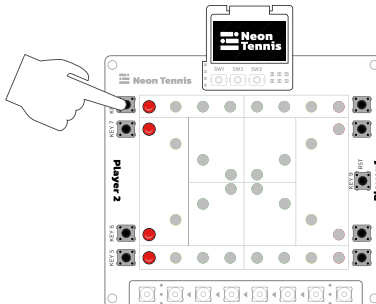
Press **KEY7**



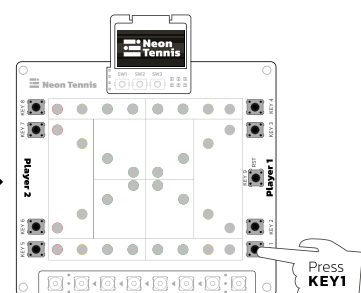
Press **KEY4**



Press **KEY8**

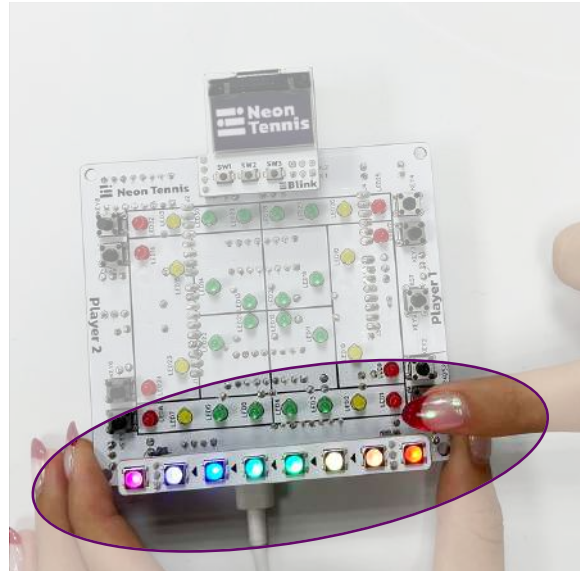
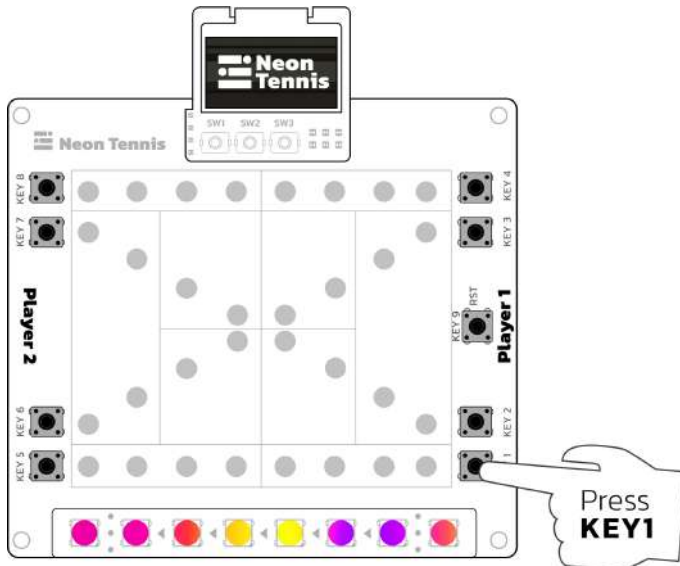


- When prompted by the Serial Monitor, **press Key1**. You should hear a sound signaling the next step.



3. Test the amomii Glow Strip

- After confirming the LEDs and buttons, **press Key1** to proceed.
- The amomii Glow strip should display a rainbow effect.



4. Completion

- If all components work as expected, the test is complete.
- You should see a message on the Serial Monitor confirming the successful test.

-> Test Complete!
-> If everything is working as expected,
upload the Neon Tennis sketch and get your game on!

By running this test code, you can ensure that all components of your Neon Tennis shield are functioning correctly before proceeding to upload and play the game. If you encounter any issues during the test, check your connections and soldering, and refer to the troubleshooting section for further assistance.



Play the Game

If you have fully completed and tested your Neon Tennis shield, all that's left to do is get your game on!

Open the **Neon_Tennis_Game code**, found in the amomii_NT_code folder. Upload it to your device, find an opponent, and head into battle!

Comprehensive Rules and Gameplay Manual

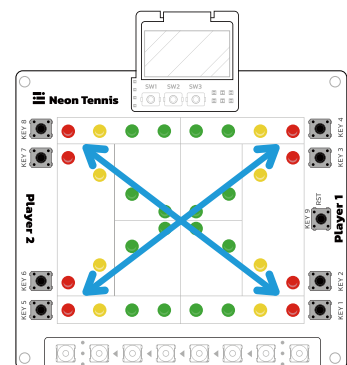
For a detailed explanation of all the game mechanics, scoring rules, and advanced strategies, please refer to the full Neon Tennis Rules and Gameplay manual. This manual is included in your welcome email and is also available for download on our website at amomii.com.

Or, simply click this link: [📁 Rules and Gameplay Manual](#)

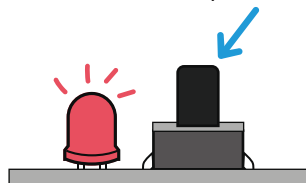
Basic Game Rules

1. Serving:

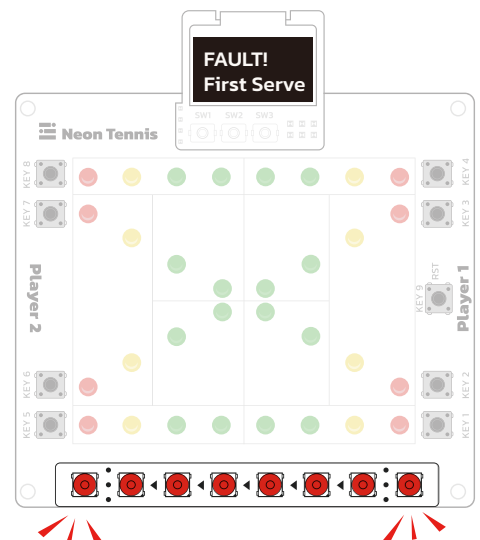
- Serve from right to left or left to right. The serve position is indicated by a flashing red LED.



- Press and hold the Serve Key to serve. The length of the press determines the serve speed.

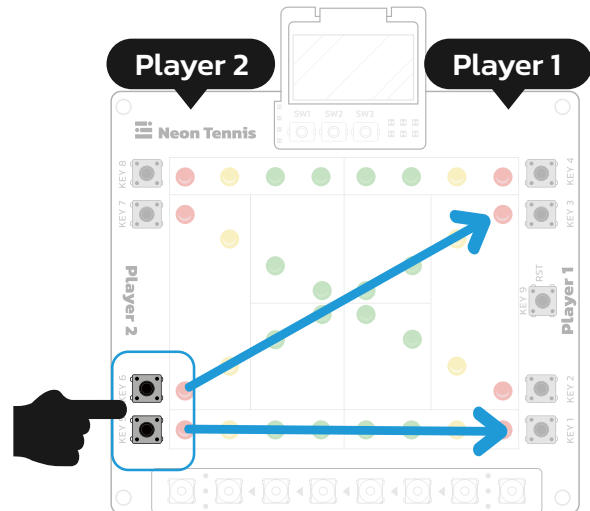
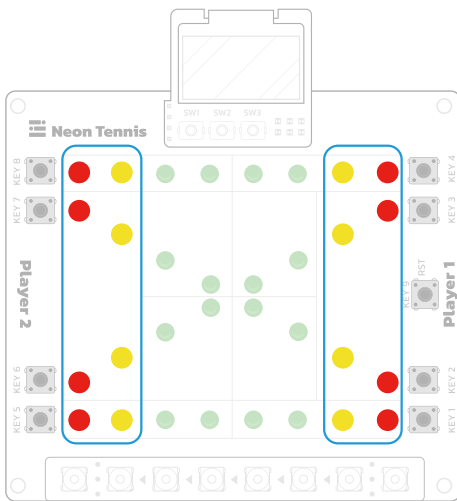


- If the Serve Key is held too long, it will result in a fault. Two faults in a row lose the point.



2. Returning:

- Return the ball by pressing the key corresponding to the ball's position.



- Timing is crucial. Pressing the key when the LED is yellow or red ensures a successful return.

Pressing the button when the Red LED is glowing increases the speed of your return.

3. Scoring:

- Follows traditional tennis scoring: 15, 30, 45, deuce, advantage.
- Win by two clear games to take a set. Win three sets to win the match.

For detailed game rules and advanced strategies, please refer to the full **Neon Tennis Rules and Gameplay** manual included in your welcome email and available for download on our website.

amomii

We hope you had a SMASHING time putting together and playing with your Neon Tennis kit.

We also hope that this is just the beginning of your Neon Tennis adventure and we would love to see what creative things you do with yours.

Keep up to date with what we have going on by visiting our website or checking out our social platforms.

 amomii.com

 Social Platforms

