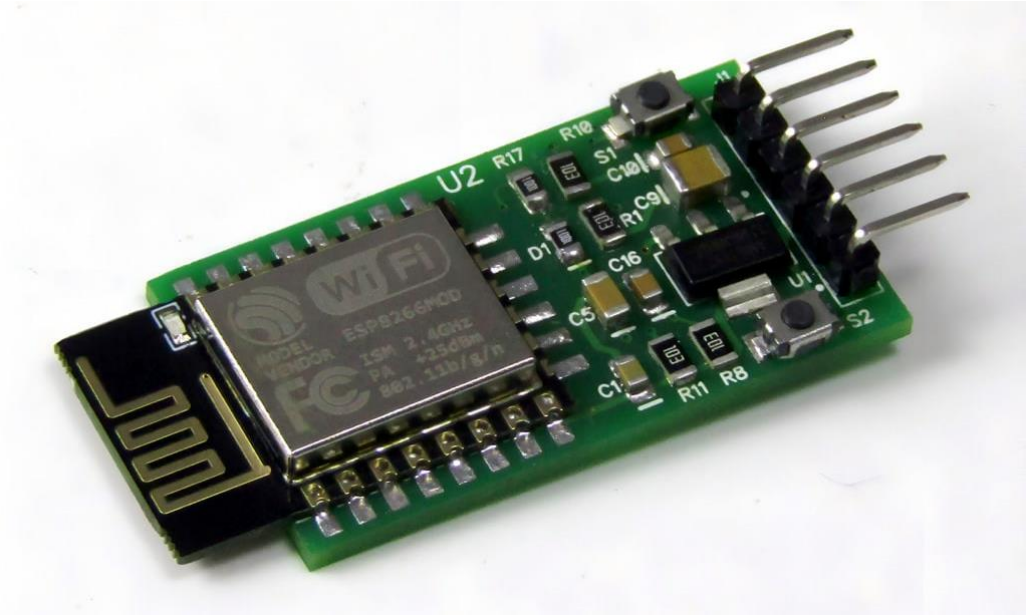
Sakthi Controller OPC Pvt Ltd

WiFi to Serial Convertor

User Guide



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1. INTRODUCTION:

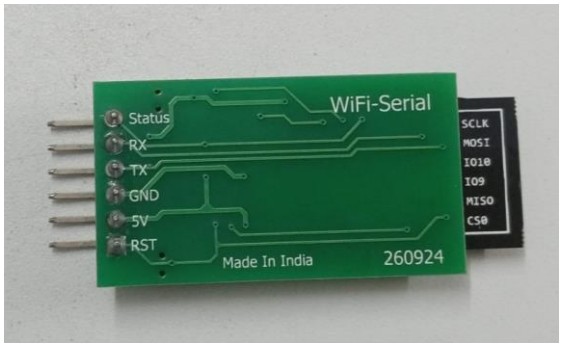
The "Wi-Fi to Serial" project is a versatile device designed to bridge Wi-Fi and serial communication seamlessly. It enables data transmission and reception over TTL (Transistor-Transistor Logic) levels, making it compatible with various embedded systems and microcontrollers. This converter allows data to be shared with multiple devices simultaneously, supports wireless data transmission, and even pushes data to specified IP addresses for remote access.

Its flexibility enables various applications, including IoT (Internet of Things) deployments, remote monitoring, and device control. The device functions effectively with minimal setup and configuration, making it an ideal solution for both hobbyist and professional projects that require reliable, wireless serial communication.

Key Applications of the Wi-Fi to Serial Converter

- The converter enables seamless data transmission and reception over TTL, making it compatible with a range of embedded devices.
- This converter supports multi-device data sharing, allowing multiple devices to access the transmitted data simultaneously.
- The converter facilitates wireless data transmission, removing the need for physical connections and offering greater flexibility.
- The device can be configured to push data to a specified IP, making remote monitoring and data access easy.
- Supports star, hub, peer-to-peer, and custom setups to meet diverse communication needs.
- Easily accessible configuration interface via any browser. Customize Wi-Fi settings, serial parameters, and packet handling options without additional software.
- Allows you to configure how data is transmitted-whether based on packet size, a specific character, or byte-by-byte control.
- Supports multiple baud rates and serial settings to suit a wide range of devices and applications.
- Seamless integration with all major operating systems, including Windows, macOS, Linux, iOS, and Android.
- Operates efficiently on a 5V power supply, making it ideal for low-power environments.

2. HARDWARE CONNECTION:



To begin, you'll need to connect the Wi-Fi to Serial converter to the device you wish to interface with.

The converter comes with four essential pins:

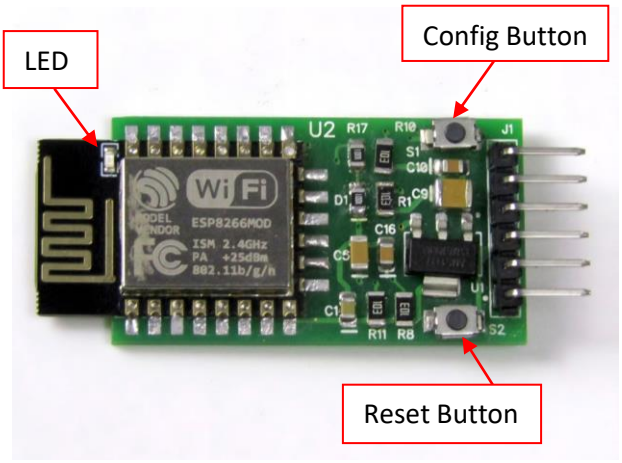
- **5V** – Connect this pin to the 5V power supply.
- **GND** – Connect this pin to the ground pin.
- **TX** (Transmit) – This pin sends data from the Wi-Fi to Serial device to the connected machine.
- **RX** (Receive) – This pin receives data from the connected machine to the Wi-Fi to Serial device.

For this setup, we'll connect the converter to a weight scale machine. The weight scale will send data through its communication pins, which you'll connect as follows:

- **5V to 5V** of the machine.
- GND to GND.
- **TX** of the Wi-Fi to Serial converter to **RX** of the machine.
- **RX** of the Wi-Fi to Serial converter to **TX** of the machine.

Once connected, the weight scale can transmit data to the Wi-Fi to Serial converter, allowing it to process and share this information wirelessly.

3. FACTORY RESET



To customize the settings of the Wi-Fi to Serial converter, the device must first be set to configuration mode.

On the device, find the S1 switch (Config button) as shown in the picture.

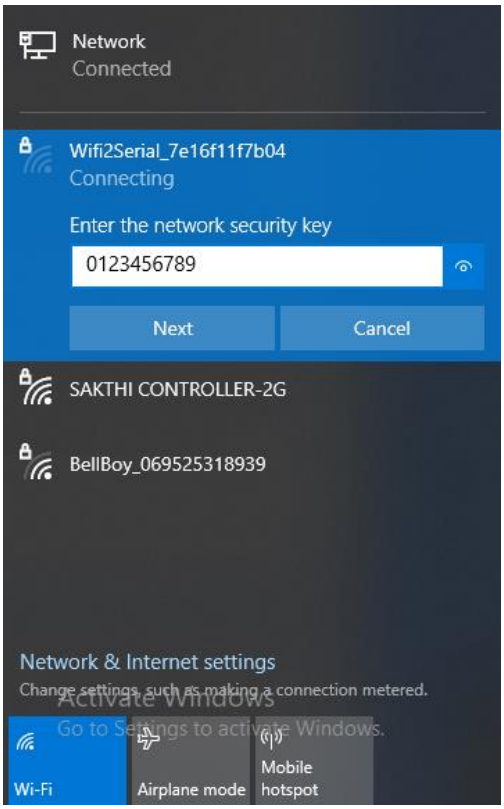
To configure the device, long press the **S1** switch for 5 seconds.

By default you'll see the LED blink rapidly every **2 seconds.** Once the device enters configuration mode then LED will blinks fast. This **fast-blinking** LED confirms that the device is ready for configuration**.**

With the device in configuration mode, you can now adjust settings as needed (we'll discuss the editable settings in the next section). If the device has already been configured and you wish to reset it, you can long press the S1 switch again while in configuration mode. This will revert all settings to the factory default configuration.

4. CONFIGURATION

Once the Wi-Fi to Serial converter is in configuration mode, you can connect to it from a mobile phone or desktop. Here's how to access the configuration page:



On your mobile, open Wi-Fi settings and look for the device's network. The network name will appear like this **Wifi2Serial_7e16f11f7b04.** Connect to this network using the default password: **0123456789**.

This will load the device's configuration page (as shown in the picture).

Note: That the configuration page will only be accessible when the device is in configuration mode. You can verify this by the fast-blinking LED, which indicates the device is ready for configuration. If the device is not in configuration mode, the IP **192.168.4.1** will not open the configuration page.

5 LOGIN

After connecting your mobile or desktop to the device's Wi-Fi, open a web browser. In the address bar, enter **192.168.4.1**.

On the configuration page at 192.168.4.1, you'll first see a login screen. To access the settings, enter the default PIN, **1234**. Once logged in, you'll be taken to the main configuration screen, where you can view and edit various device settings. This login step helps ensure that only authorized users can make changes to the configuration.

Before diving into editing the configuration, it's essential to understand the three connection methods available in the Wi-Fi to Serial converter.

Connection Methods for Wi-Fi to Serial Configuration

- **Peer-to-Peer (Access Point to Client)**: This method allows direct connection between two devices, where one acts as the access point and the other as the client.
- **Star Configuration**: In this mode, the converter can connect up to four devices as clients or as an access point (AP), enabling centralized data sharing with multiple devices.
- **Hub Mode (LAN Router Connection)**: Here, the device connects via a LAN router, which facilitates data transmission across a network of connected devices.
- Each of these configurations provides different ways to connect and share data, depending on your application needs.

6 Wi-Fi SETTING

6.1 Wi-Fi MODE

Wi-Fi Mode Option	Description	Functionality
Access Point (AP)	Acts as a server	This device allows other devices to connect to it but cannot connect to other devices as a client.
Station (STA)	Acts as a client	This device can connect to an AP (server) but cannot act as a server itself.
AP + STA	Acts as both server and client	This device can simultaneously function as an AP (serving as a server) and as a client, connecting to another AP.

6.2 AP PASSWORD:

Next, you'll see the **AP Password** field. This is where you can change the default password (currently **0123456789**) to a custom password of your choice. Ensure that the new password is at least **8 characters long** for security. This updated password will be required for any device attempting to connect to the Wi-Fi to Serial converter when it's set as an Access Point.

6.3 CHANNEL NUMBER:

This setting determines the channel used for data transmission through the socket. By default, the channel is set to **1**, but you can choose any channel from **1 to 13**. If you experience congestion or interference on the current channel, switching to a different channel can help optimize the network, allowing for smoother data transmission and reducing potential connectivity issues. This is not applicable for Station mode.

6.4 MAX CONNECTION

The Max Connection setting defines the maximum number of devices that can connect to the Wi-Fi to Serial converter when it's set to **Access Point (AP)** mode. This option is not applicable in Station (STA) mode. The maximum limit for connected devices is **4**; meaning up to four devices can connect simultaneously.

Additionally, you can apply filters to control which specific devices are allowed to connect, ensuring that only authorized devices can join the network. This helps manage and secure connections in AP mode.

6.5 HIDE SSID

The Hide SSID option provides additional security by allowing you to control the visibility of the Wi-Fi to Serial device's network name (SSID). This setting has two options:

- **NO**: If you select "No," the device's SSID will remain visible in Wi-Fi settings on mobile and other devices, making it easily discoverable for connection.
- **Yes**: If you select "Yes," the device's SSID will be hidden after configuration. This means it won't appear in Wi-Fi settings, enhancing security by preventing unauthorized users from easily discovering it.

Note: If you choose "Yes" and later need to reconfigure the device, you'll need to reset it to factory settings. To do this, press and hold the S1 switch for 5 seconds to return the device to configuration mode and again long press for 5 sec to factory reset and set to default configuration then only the SSID visible again for further adjustments.

6.6 LOGIN PIN

The Login PIN setting allows you to change the default login PIN (currently **1234**) used to access the configuration page. Updating this PIN enhances security by restricting

access to configuration settings, ensuring that only users with the new PIN can make changes to the device's setup.

6.7 Wi-Fi NAME

The Wi-Fi Name setting allows you to select the network you want the Wi-Fi to Serial converter to connect to. Here's how it works depending on the Wi-Fi mode:

- **Access Point (AP) mode**: The device acts as a server (AP), and you can connect it to a router or any other network. The router's Wi-Fi will act as the client, while the device functions as the server, providing access to other devices.
- **Station (STA) mode**: The device can connect to any other server or network. In this mode, the Wi-Fi to Serial converter behaves as a client and can connect to a Wi-Fi router, or any other access point, enabling it to receive data and communicate over the network.
- **Access Point (AP) + Station (STA):** The device acts as a server (AP) and also can connect to any other server or network, and you can connect it to a router or any other network.

You simply select the network name (SSID) from the available list of Wi-Fi networks and enter the password to establish the connection.

6.8 Wi-Fi PASSWORD

The Wi-Fi Password setting requires you to enter the password for the network you selected in the Wi-Fi Name field. Here's what to do based on your selection:

- **If you selected Access Point (AP) mode**: Enter the password that you previously set in the AP Password field. By default, this password is 0123456789**.**
- **If you selected another network (**e.g., a Wi-Fi router or server device**)**: Enter the password for the network you are connecting to. This will be the password for the router or access point that the Wi-Fi to Serial converter is joining as a client.

Make sure the password is accurate to ensure a successful connection to the selected network.

6.9 IP TYPE

In setting gives you two options for configuring the device's network settings:

- **Static**: If you select "Static," you will need to manually enter the following network settings:
  - **Local IP**: The specific IP address you want to assign to the device.
  - **Subnet Mask**: Defines the network portion of the IP address.
  - **Gateway**: The IP address of the gateway (usually your router) that connects the local network to the outside world.
  - **Primary DNS**: The primary DNS server to resolve domain names.

- **Secondary DNS**: The backup DNS server in case the primary DNS server is unavailable.

- **Dynamic (DHCP)**: If you choose "Dynamic," the device will automatically obtain an IP address and other necessary network settings (such as Gateway and DNS) from the router or network it's connected to. No manual entry is needed for this option.

This flexibility allows you to choose between a fixed IP configuration (Static) or letting the device automatically get its settings (Dynamic).

7 SERIAL CONFIGURATIONS

7.1 Mode

The Mode setting allows you to specify whether the Wi-Fi to Serial converter will act as a **Client** or a **Server**:

- **Client Mode:** If you choose **"**Client," the device will act as a client and it can able to connect with the server.
- **Server Mode**: If you choose "Server," as the device itself will act as the server, and other devices will connect to it.

7.2 SERVER IP

- The server IP is usually **192.168.4.1**, which is common for all Wi-Fi to Serial devices.
- If the device is configured as “Client” then you should enter the server IP.
- If the device is configured as “Server” then no needs to enter a server IP.
- **If connected to an AP device**: The server IP is usually **192.168.4.1.**
- **If connected to another network or router**: You will need to enter the server IP of the network or device to which you want the client to connect.

7.3 PORT

The Port setting allows you to specify the communication port for data transmission. By default, the port is set to **8080**, but you can change it to any other port number as required for your application. This port is used for network communication between the device and other connected devices or servers. Make sure the chosen port is not already in use by other services on the network to avoid conflicts.

7.4 BAUD RATE

The Baud Rate setting determines the speed at which data is transmitted over the serial connection. There are several baud rate options available, including 9600**,** 115200, and more. You can choose the baud rate that best suits your application and connected devices. A higher baud rate allows for faster data transmission, but it's important to ensure that both the Wi-Fi to Serial converter and the connected device support the selected baud rate to maintain smooth and reliable communication.

7.5 FRAME LENGTH

The Frame Length setting controls how much data the Wi-Fi to Serial converter will collect before it sends the data. For example, if you set the frame length to **32**, the device will collect 32 byte of data and then send it all at once. This function is useful for managing data transmission, ensuring that the device waits until a full set of data is collected before transmitting, which can improve efficiency and reduce network congestion. The frame length can be adjusted based on the specific needs of your application and the size of the data being transferred.

7.6 FRAME TIMEOUT

The Frame Timeout setting defines the maximum amount of time the device will wait for the data to reach the specified Frame Length (e.g., 32 byte). If the data doesn't reach the frame length within the set timeout period, the device will send the collected data even if it's less than the full frame size.

For example, if you set the timeout to **10 ms**, the device will wait for up to 10 milliseconds for additional data to arrive. If the full 32 byte aren't received within that time, it will send whatever data has been collected up to that point. This setting helps prevent delays in transmission when the data collection is incomplete or slower than expected.

7.7 ALLOW IP

The Allow IP setting enables you to filter and restrict which devices can connect to the Wi-Fi to Serial converter based on their IP addresses. By adding specific IP addresses, you ensure that only those devices are allowed to establish a connection with the converter. For example, you can add IPs like 192.168.1.35**,** 192.168.1.44**,** 192.168.1.32**,** 192.168.1.73**,** and only these devices will be able to connect.

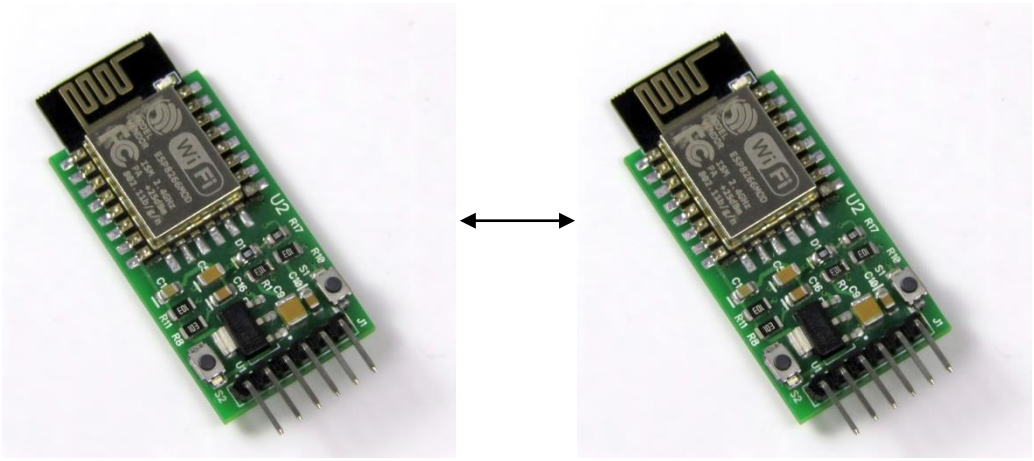
This feature enhances security by preventing unauthorized devices from accessing the Wi-Fi to Serial converter, ensuring that only trusted IP addresses can interact with it.

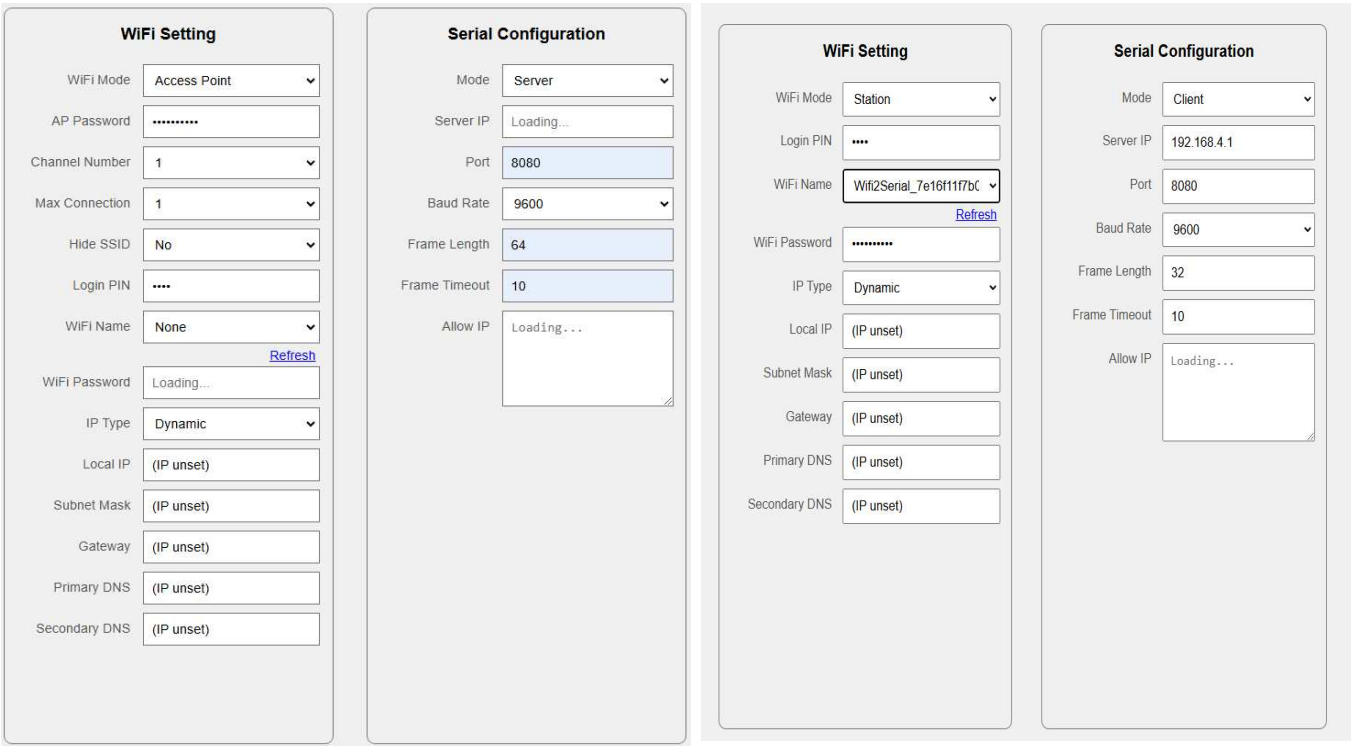
8. PEER-TO-PEER MODE

For Peer-to-Peer mode, you would configure one device as the Access Point (server) and another as the Station (client). This setup allows for direct data transmission between the two devices, with one acting as the master and the other as the client.

Server

Client



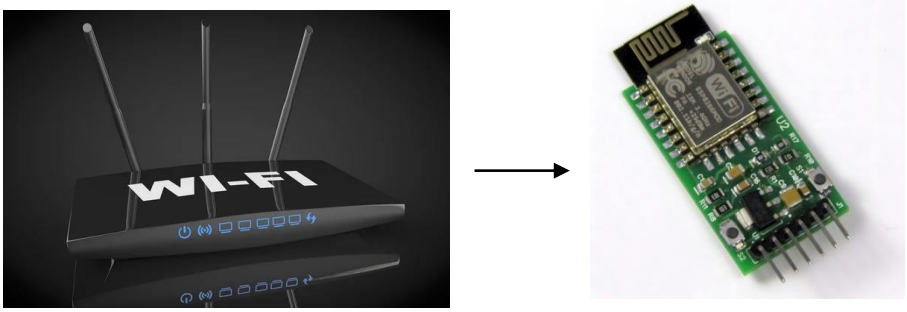


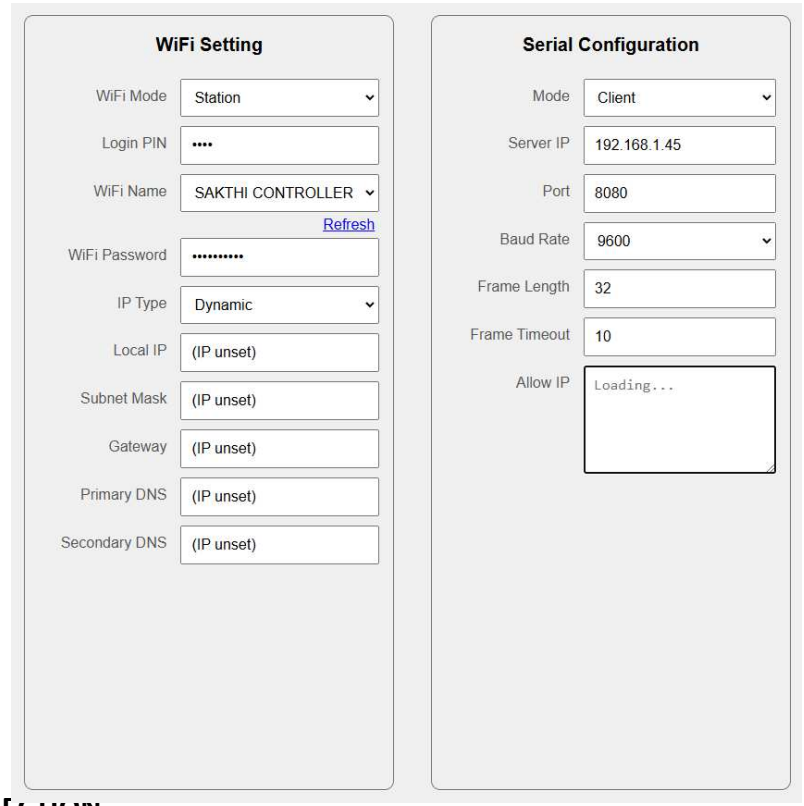
9. HUB MODE (LAN Router Integration)

In Hub Mode, the router acts as a central hub, and multiple devices can connect to it, forming a network.

In this mode, you connect the Wi-Fi to Serial converter to a router or third-party network by selecting the Wi-Fi Name and entering the Wi-Fi Password. Then, set the device to Client mode and enter the Server IP for the router or server you wish to connect to. Once the device is connected, it can also connect other devices to the same network in the same manner.

This setup creates a hub connection, where the router or network acts as the server, and all other devices connected to it act as clients. The router serves as a communication bridge for data transmission between all connected devices, enabling seamless communication across multiple devices through the central network.

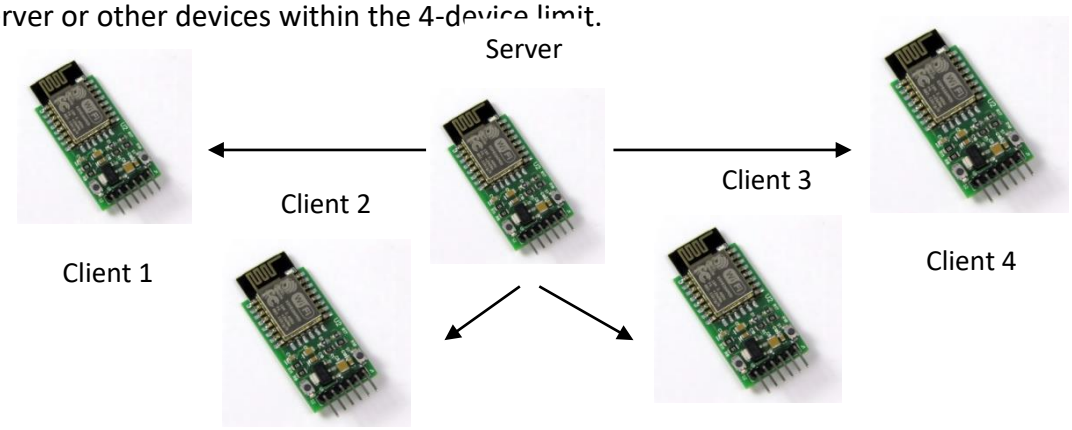




10. STAR CONNECTION

Star Connection works similarly to Hub Mode but with more flexibility. In this setup, the third-party network can act as either a server or a client, unlike Hub Mode, where the third-party network is always the server. The Star Connection allows you to connect up to **4** devices to a third-party network, and the role of the server can be either one of the devices or the third-party network itself.

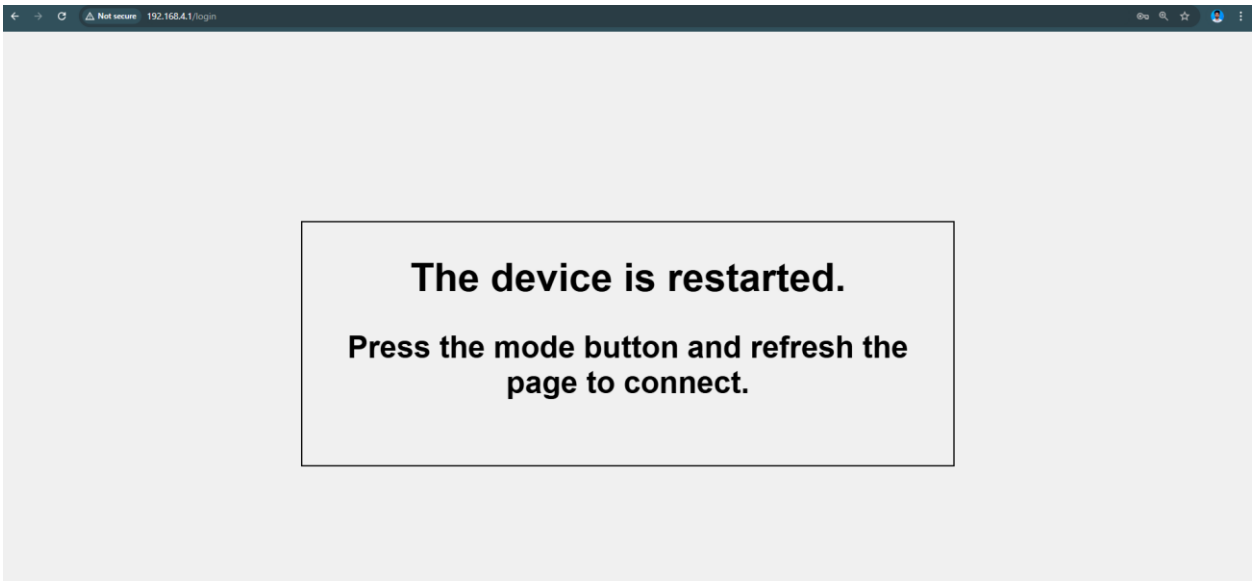
In this connection model, you can limit the number of devices that connect to the network, with the total number of devices being **4**. One device or the third-party network will act as the server, while the remaining devices will act as clients. This configuration provides a flexible, multi-device connection, where each device can connect to and communicate with the server or other devices within the 4-device limit.



11. SAVE AND RESTART

Once you have completed the configuration for each device, you will see two buttons at the top of the configuration page: Save and Restart and Restart.

- **Save and Reset**: After finalizing your configuration, you must click the **Save and Restart** button. This will save all the settings you have configured and then restart the device. After the restart, the device will exit the configuration mode and return to functional mode, or it will attempt to connect to the device or network as specified in the configuration.
- **Restart**: If you want to discard the changes you've made and restart the device to its default settings, you can use the **Restart** button instead.



Using the Save and Restart button is essential to apply the changes and ensure that the device operates based on the updated configuration.

Important Notes on Connection Indication LEDs:

- **When the device is connected:** The LED will blink every **5 seconds** to indicate that the device is successfully connected to the network or another device and operating normally.
- **When the device is in normal mode:** The LED will blink every **1 second**, indicating that the device is looking for the configured device on the network in order to connect to it.
- **When the device is in configuration mode:** The LED will **blink rapidly**, indicating that the device is in config mode and ready to be configured.

These LED indications help you easily identify the status of the device, ensuring you know whether it's connected, operating normally, or in configuration mode.