

P10 Display



S.NO	Title	Page No.
1	INTRODUCTION	3
2	HARDWARE CONNECTION	4
3	FACTORY RESET	5
4	CONFIGURATION	6
5	LOGIN	7
6	Wi-Fi SETTING	8
6.1	Wi-Fi MODE	8
6.2	AP PASSWORD	9
6.3	CHANNEL NUMBER	9
6.4	MAX CONNECTION	9
6.5	HIDE SSID	9
6.6	LOGIN PIN	10
6.7	Wi-Fi NAME	10
6.8	Wi-Fi PASSWORD	10
6.9	IP TYPE	10
7	SERIAL CONFIGURATIONS	11
7.1	MODE	11
7.2	SERVER IP	11
7.3	PORT	11
7.4	BAUD RATE	12
7.5	FRAME LENGTH	12
7.6	FRAME TIMEOUT	12
7.7	ALLOW IP	12
8	DISPLAY CONFIGURATIONS	13
8.1	FONT	13
8.2	ALIGNMENT	13
8.3	SPEED	13
8.4	TIMEOUT	13
8.5	BRIGHTNESS	13
9	SAVE AND RESTART	14
10	P10 to Wi-Fi - Serial	15
11	Wi-Fi MODE	16
12	USB MODE	17
13	RS232 MODE	18
14	IMPORTANT NOTES	18

1. INTRODUCTION

The "P10 Display" project is a versatile device designed to bridge Wi-Fi serial communications and RS232 communications seamlessly, specifically for P10 LED displays. 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.

Key Applications of the P10 Display

- **Seamless Data Transmission:** The converter enables seamless data transmission and reception over TTL, making it compatible with a range of embedded devices.
- **Wireless Data Transmission:** The converter facilitates wireless data transmission, removing the need for physical connections and offering greater flexibility.
- **Remote Monitoring:** The device can be configured to push data to a specified IP, making remote monitoring and data access easy.
- **User-Friendly Configuration:** Easily accessible configuration interface via any browser. Customize Wi-Fi settings, serial parameters, and packet handling options without additional software.
- **Flexible Data Transmission:** Allows you to configure how data is transmitted—whether based on packet size, a specific character, or byte-by-byte control.
- **Wide Range of Serial Settings:** Supports multiple baud rates and serial settings to suit a wide range of devices and applications.
- **Cross-Platform Integration:** Seamless integration with all major operating systems, including Windows, macOS, Linux, iOS, and Android.
- **Low Power Consumption:** Operates efficiently on a 5V power supply, making it ideal for low-power environments.
- **RS232 Data Transfer:** Supports data transfer through RS232, expanding compatibility with a broader range of devices and communication standards.
- **P10 LED Display Integration:** Capable of displaying data on a P10 LED display, making it ideal for creating dynamic and engaging visual displays for various applications.

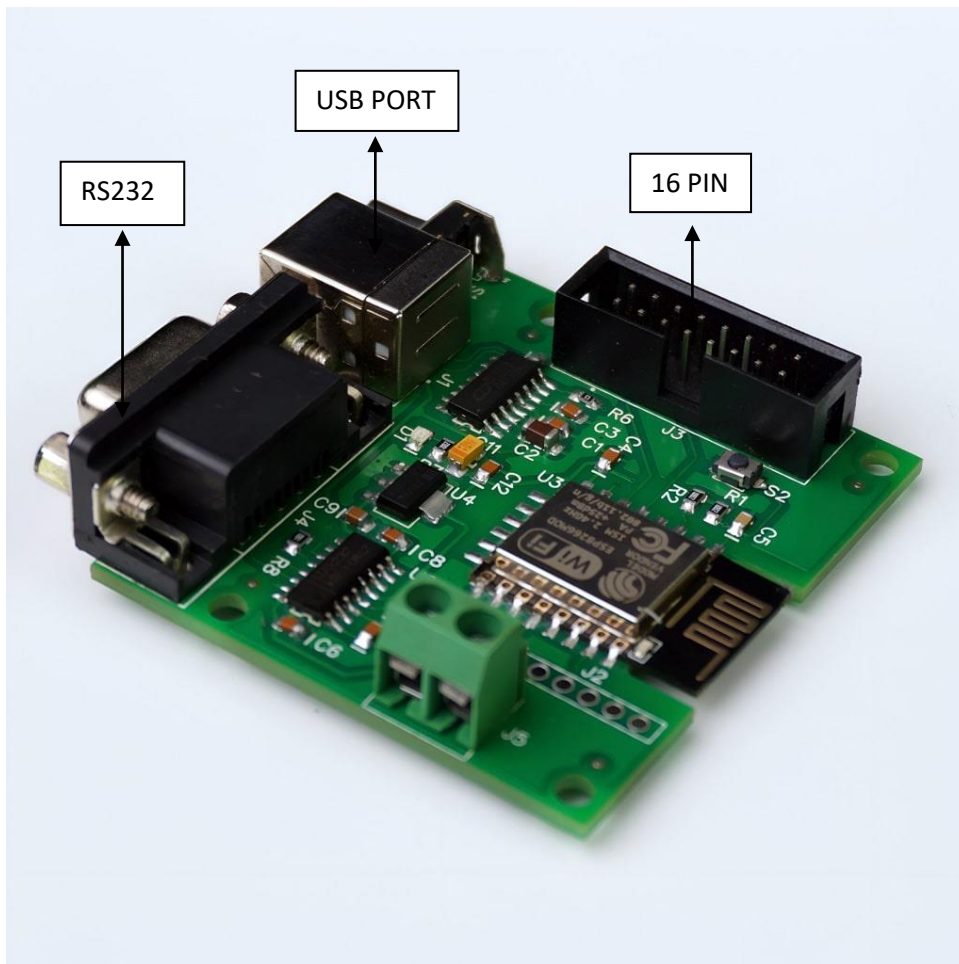
2. HARDWARE CONNECTION:

To begin, you'll need to connect the P10 converter to the device you wish to interface with.

The converter comes with essential ports and pins:

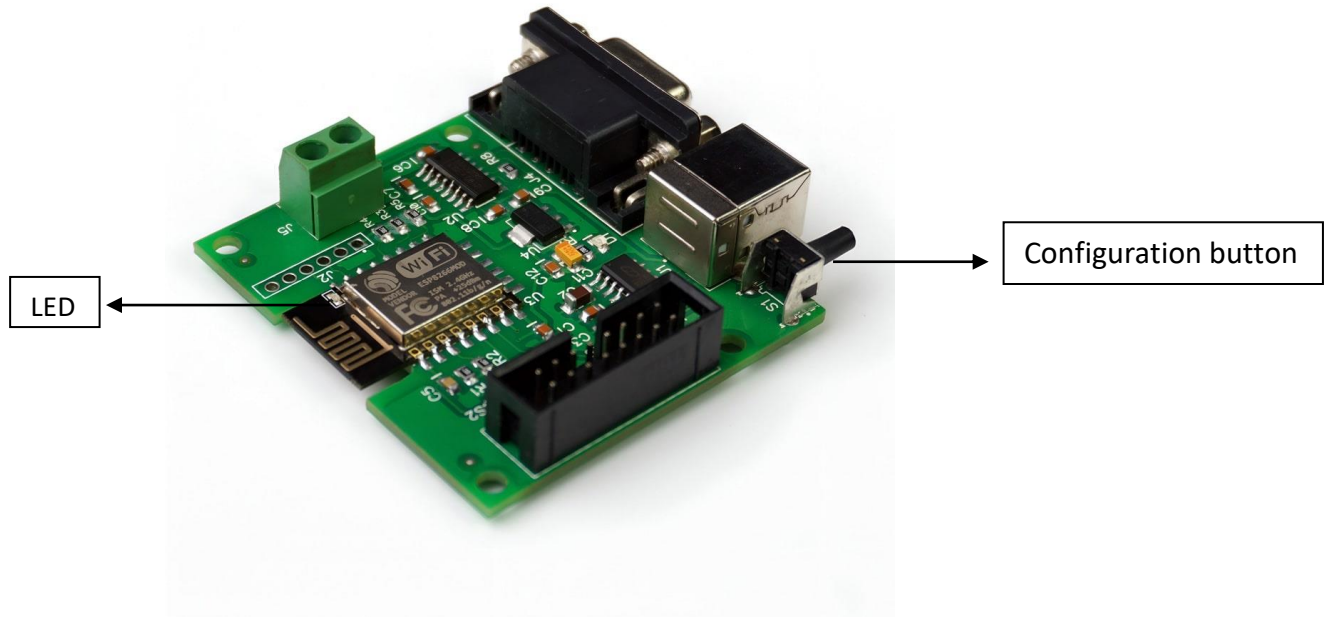
- **5V** – Connect this pin to the 5V power supply.
- **GND** – Connect this pin to the ground pin.
- **USB PORT** – This port used to transfer the data through USB – B type to P10 display.
- **RS232 PORT**– This port used to transfer the data through the RS232 to P10 display.
- **16 PIN FRC** - This connector is used to connect with P10 display.

In case of using Wi-Fi and RS232, P10 converter needs any external power supply.



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 configuration button as shown in the above picture. To configure the device, long press the configuration button for 5 seconds.

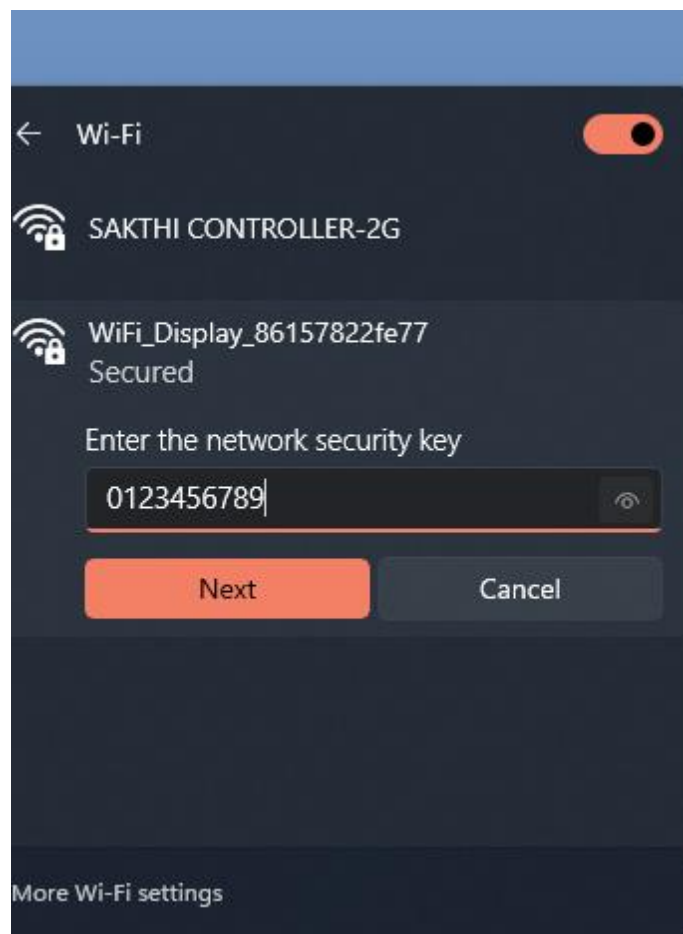
By default you'll see the LED blink rapidly every **2 seconds**. Once the device enters configuration mode then LED will blink fast. This **fast-blinking** LED confirms that the device is ready for configuration.

When the device is 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 configuration button 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 **WiFi_Display_86157822fe77**. 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.

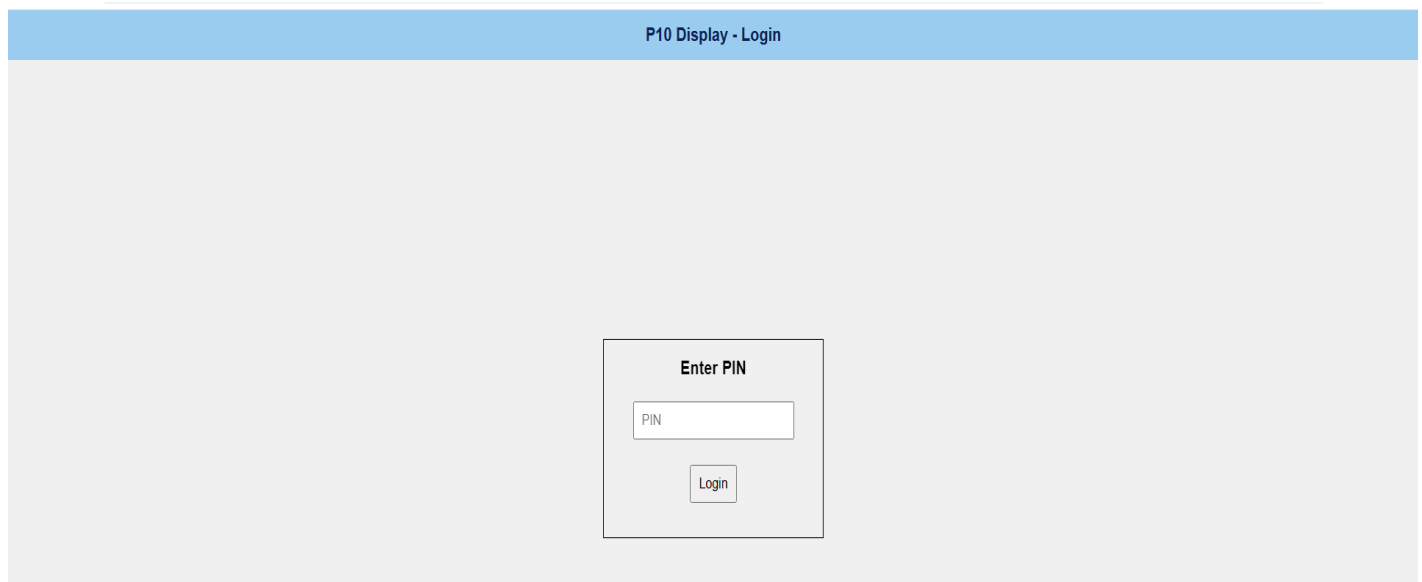
5 LOGIN

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.

A screenshot of a web browser displaying the "P10 Display - Login" page. The page has a light blue header with the text "P10 Display - Login". The main content area is light gray and contains a white box with the title "Enter PIN". Inside this box, there is a text input field labeled "PIN" and a "Login" button below it.

After entering the login pin, it will direct you to configuration page. In configuration page we can configure Wi-Fi setting, Serial configuration and Display configurations.

WiFi Setting

WiFi Mode Access Point

AP Password Loading...

Channel Number 1

Max Connection 1

Hide SSID No

Login PIN Loading...

WiFi Name None [Refresh](#)

WiFi Password Loading...

IP Type Dynamic

Local IP Loading...

Subnet Mask Loading...

Gateway Loading...

Primary DNS Loading...

Secondary DNS Loading...

Serial Configuration

Mode Server

Server IP Loading...

Port Loading...

Baud Rate 2400

Frame Length Loading...

Frame Timeout Loading...

Allow IP Loading...

Display Configuration

Font Droid Sans

Alignment Left

Speed 1x

Brightness 100 %

Time Out Disable

Save Lastdata No

Panel Width Loading...

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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 Configuration button 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 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 isn'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. DISPLAY CONFIGURATION

In display configuration, it allows to change the Font, Alignment, scroll speed, Timeout.

8.1 FONT

In font setting, it enables you to change the font style as per user requirements.

8.2 ALIGNMENT

In alignment option, it enables you where to the start text on display (RIGHT OR LEFT).

8.3 SPEED

In speed option, it enables you how fast the text should scroll.

8.4 TIME OUT

In time out option, it enables you how long we can wait for new data, if the new data not received in desired time, P10 display shows “NO DATA” message. We can disable this using disable option.

8.5 BRIGHTNESS

In brightness option, it offers you to control the brightness of the p10 display.

Display Configuration

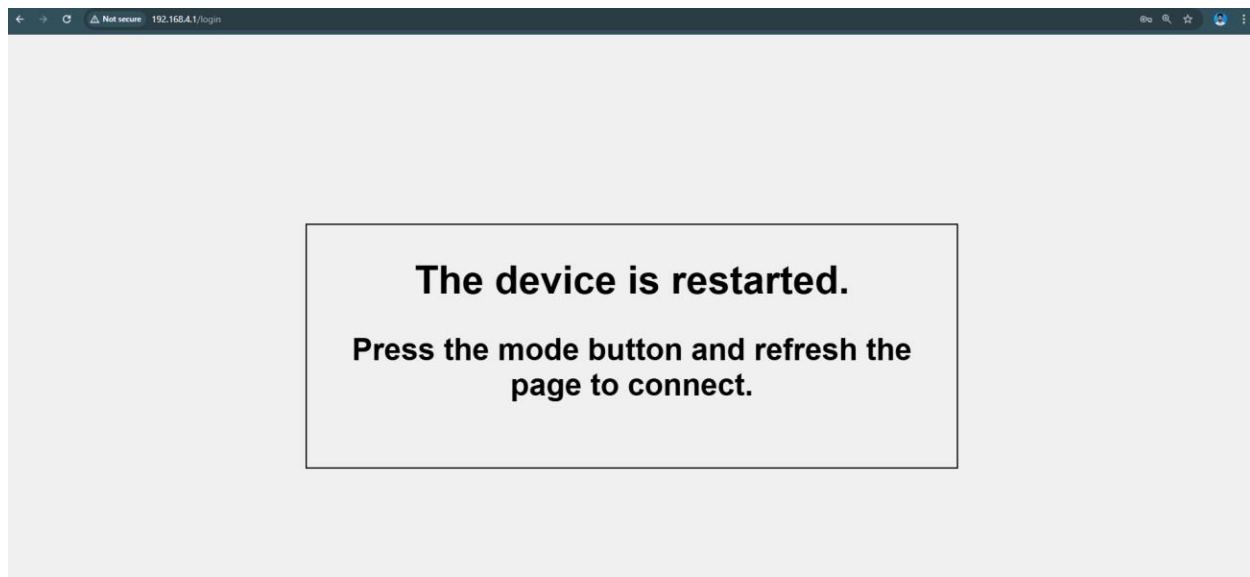
Font	Droid Sans ▼
Alignment	Left ▼
Speed	1x ▼
Brightness	100 % ▼
Time Out	Disable ▼
Save Lastdata	No ▼
Panel Width	2

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9. 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:

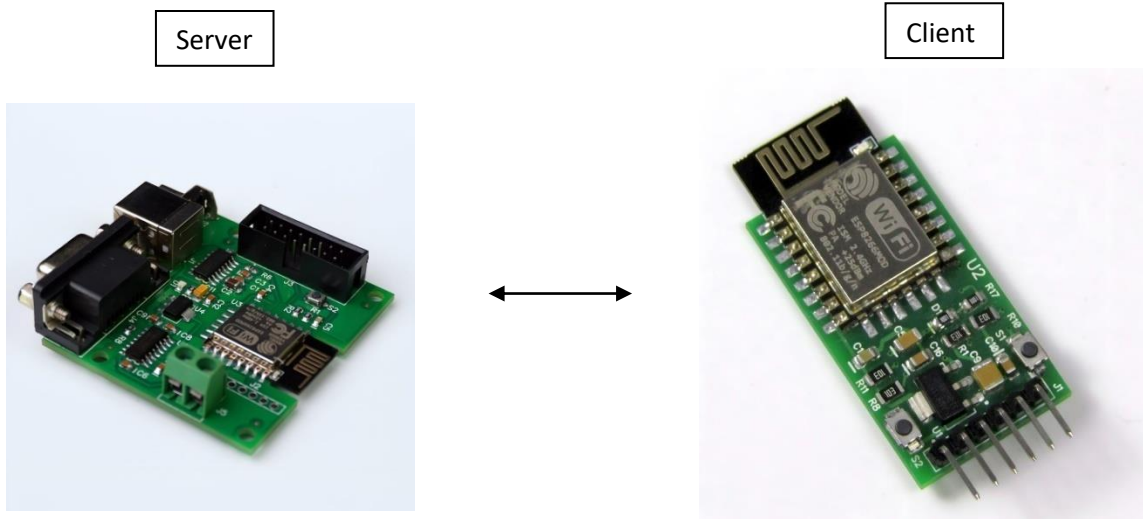
- **When the device is connected:** The LED will blink every **5 seconds** to indicate that the device is successfully connected to the network or another device and operating normally.
- **When the device is in normal mode:** The LED will blink every **1 second**, indicating that the device is looking 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 configuration 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.

10. P10 to Wi-Fi Serial

For P10 to Wi-Fi serial configuration, 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.



WiFi Setting

WiFi Mode: Access Point

AP Password: *****

Channel Number: 1

Max Connection: 1

Hide SSID: No

Login PIN: ****

WiFi Name: FanyLink_OC1F35 [Refresh](#)

WiFi Password: *****

IP Type: Dynamic

Local IP: 192.168.1.43

Subnet Mask: 255.255.255.0

Gateway: 192.168.1.1

Primary DNS: 218.248.112.65

Secondary DNS: 218.248.112.1

Serial Configuration

Mode: Server

Server IP: Loading...

Port: 8080

Baud Rate: 9600

Frame Length: Loading...

Frame Timeout: Loading...

Allow IP: Loading...

Display Configuration

Font: Droid Sans

Alignment: Left

Speed: 10x

Brightness: 50 %

Time Out: Disable

Save Lastdata: Yes

Panel Width: 2

WiFi Setting

WiFi Mode: Station

Login PIN: ****

WiFi Name: Wifi2Serial_7e16f11f7bc [Refresh](#)

WiFi Password: *****

IP Type: Dynamic

Local IP: (IP unset)

Subnet Mask: (IP unset)

Gateway: (IP unset)

Primary DNS: (IP unset)

Secondary DNS: (IP unset)

Serial Configuration

Mode: Client

Server IP: 192.168.4.1

Port: 8080

Baud Rate: 9600

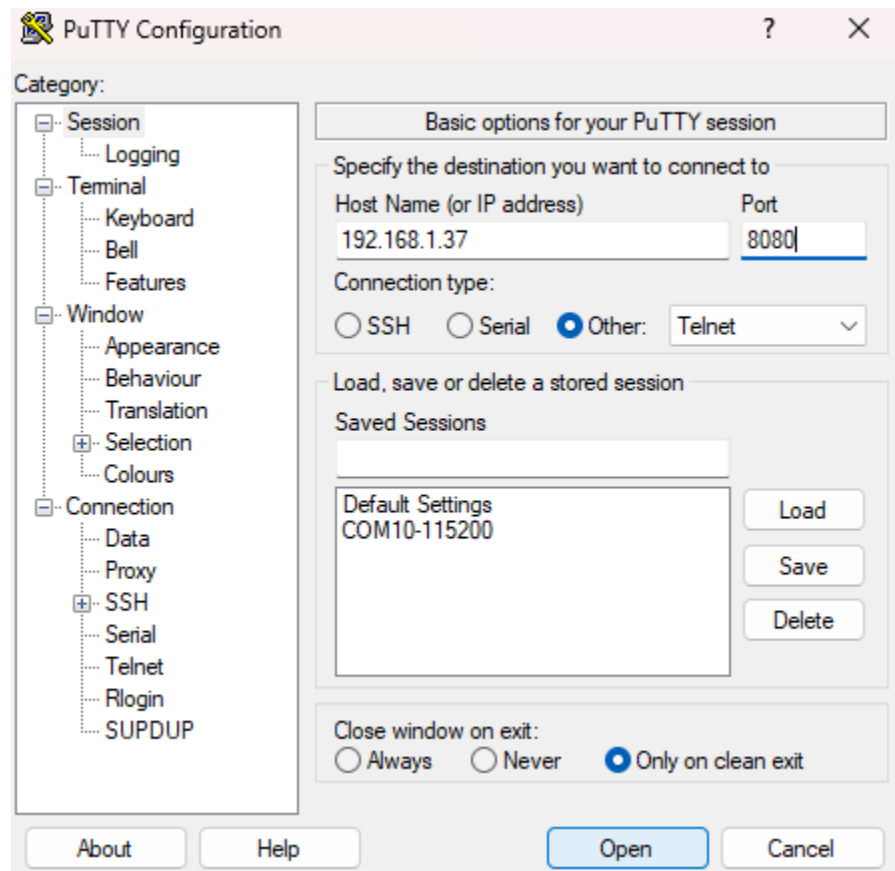
Frame Length: 32

Frame Timeout: 10

Allow IP: Loading...

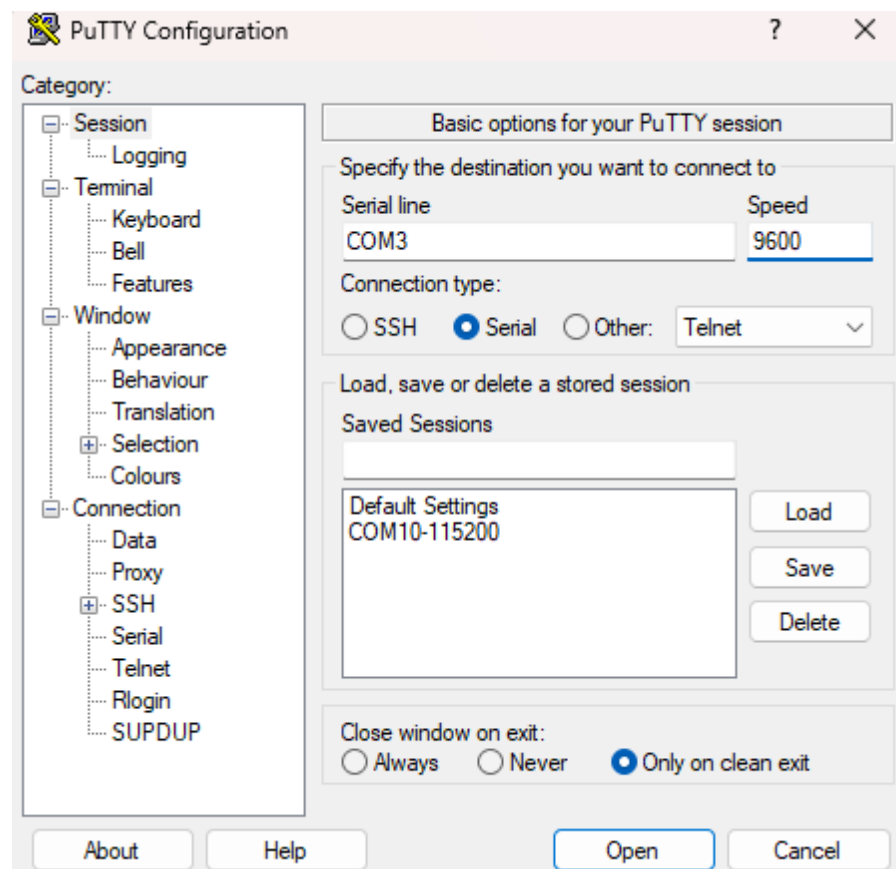
11. Wi-Fi MODE

- After save and restart process, our device is ready to transmit the data.
- On clicking the Configuration button to enter into configuration page and find the LOCAL IP which is generated automatically, if the device connected with the Wi-Fi. Note down that IP and press SAVE and RESTRAT.
- On putty terminal, select other in option and enter the generated **LOCAL IP** which is generated and set **PORT** number which you have entered in the configuration page (8080 default).



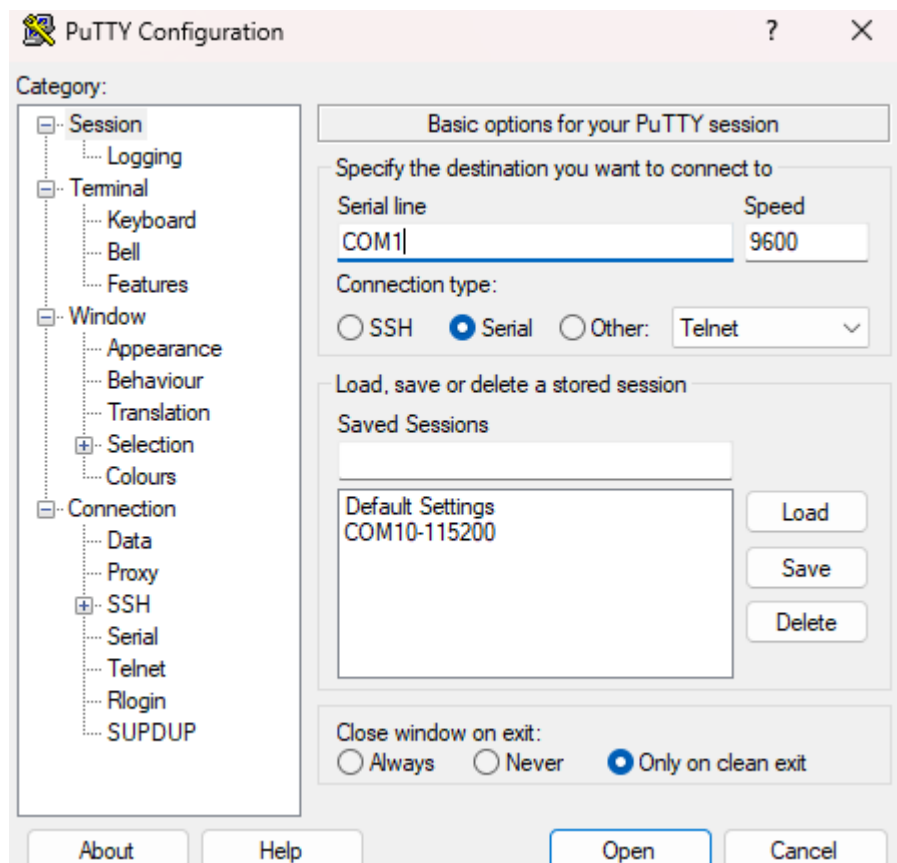
12. USB MODE

- In USB mode, we don't need any external power supply to our board.
- We can connect our board to your Personal Computer by using "USB -B" type connector.
- On connecting to your Personal Computer, we can see COM port on device manager page.
- Now we can go to serial Monitor like putty, Arduino etc.
- Here, we have connected with putty, enter the **COM** port number in serial line and enter the **Baud rate** in speed.
- For USB mode we need to place a 0R resistor on R6 pad in our P10 mother board.



13. RS232 MODE

- In RS232, we need external power supply (5V) to our board.
- We can connect our board to your pc by using “**RS232**” type connector.
- On connecting to your Personal Computer, we can see COM port on device manager page.
- Here, we have connected with putty; enter the COM port number and baud rate.
- For RS232 mode we need to place a 0R resistor on R8 pad in our P10 mother board.



14. IMPORTANT NOTES

- Donot use external power supply, while using the USB mode.
- This device can work simulataneously with WiFi and USB mode or WiFi and RS232 only.
- To alter the combination you can check the appropriate mode configuration steps.
- For more details click the link(youtube video link).