Espressif

Smart Plug

User Guide

Version 1.0

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1. Concept introduction

1.1. ESP IOT Platform

ESP SDK provides users with a simple, fast and efficient development platform for Internet of Things (IOT) products. The ESP IOT Platform is based on the FreeRTOS ESP SDK and adds on to it some commonly used functionalities, in an example application of a smart plug. This application uses ESP-Touch protocol to realize smart configuration of the device. The communication protocols used are JSON and HTTP REST. An Android mobile APK is also included as a basic template for the users.

1.2. ESP-Touch

ESP-Touch is a protocol developed by Espressif, to configure the Wi-Fi devices to connect to the router. The device can be configured by ESP-Touch only when it is in the SMART CONFIGURATION MODE. For details of the configuration procedure, refer to ***3. Device Configuration***.

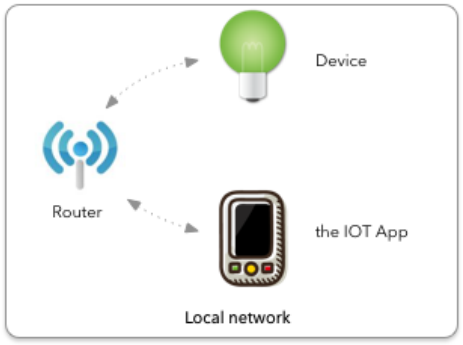
1.3. IOT Espressif App

IOT Espressif App (hereinafter referred to as IOT app) is a smartphone application developed by Espressif. It is used to achieve local and remote control of Wi-Fi devices, including smart lights and smart plugs. The app is open source, and found on Github (https://github.com/EspressifApp/IOT-Espressif-Android).

1.4. Local and cloud device

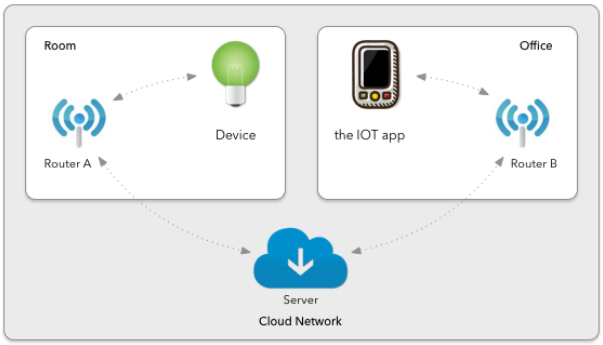
1.4.1. Local device

If a device is configured to the router by ESP-Touch, but not activated on the server-end, it is a local device, as the figure shown below. Such a device is accessible over Wi-Fi when the mobile app is on the Wi-Fi network, but not over the cloud platform.



1.4.2. Cloud device

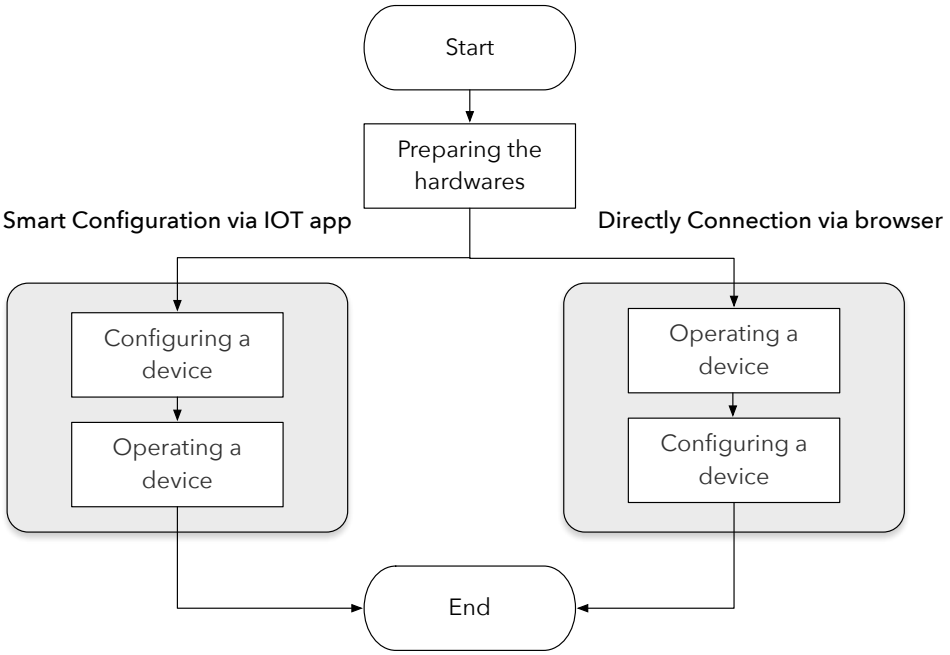
If a device is configured to the router by ESP-Touch, and activated on the server-end, it is now a cloud device. There are three possible connection statuses: on cloud, local Wi-Fi, or offline, as the figure shown below.



2. Device configuration

2.1. Overview

You can configure a device via IOT app or just operate a device via browser, as shown in the figure below.



There are two modes for the smart plug:

- SMART CONFIGURATION MODE: You can configure the device by IOT app in this mode.
- DIRECTLY CONNECTION MODE: You can operate the device by web browser in this mode.

2.2. Preparing the hardware

The following hardware devices are needed.

2.2.1. Client software

- A mobile phone with IOT app, or
- a mobile phone with the browser, or
- a PC with the browser.

2.2.2. Micro-USB Cable

ESP8266 is connected to power with micro-USB cable and power adapter.

2.2.3. Router (Optional)

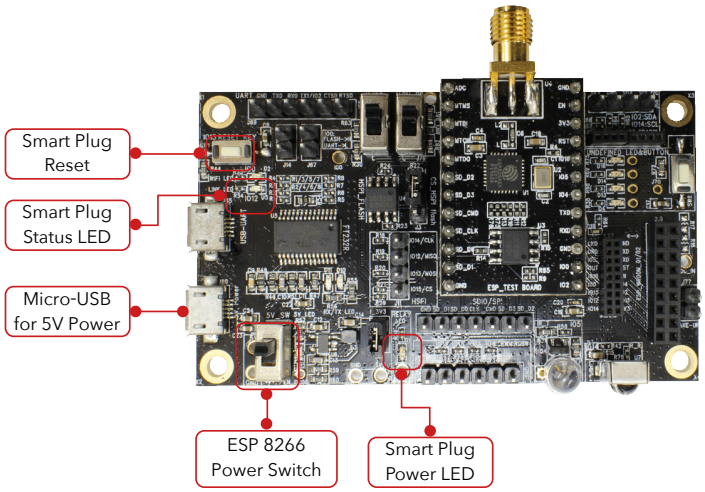
A router that can be connected to the internet. (If you only need to operate the local devices, you don't need to connect to the internet.)

2.2.4. Smart plug firmware

Smart plug firmware is based on the FreeRTOS ESP8266 SDK (https://github.com/espressif/esp_iot_rtos_sdk) and adds on to it some commonly used functionalities (https://github.com/espressif/esp8266_iot_platform), in an example application of a smart plug.

> ***Notice***:
>
> We use ESP8266 Development Board with the smart plug firmware to show the process, and the smart plug firmware can work with any ESP modules.

ESP8266 Development Board and related buttons and indicator LEDs are shown as below.



Name	Description	GPIO
Smart Plug Reset	The reset button of smart plug.	GPIO 13
Smart Plug Status LED	Blue light, indicate the status of the smart plug. There are 3 statuses: • Blue light flashes slowly. • Blue light flashes quickly. • Blue light is on.	GPIO 12
Micro-USB for 5V Power	The Micro-USB power jack of ESP8266 for 5V power.	-
ESP8266 Power On/ Off	The power switch of ESP8266.	-
Smart Plug Power LED	The indicator LED of the smart plug power on/off.	GPIO 15

Note:

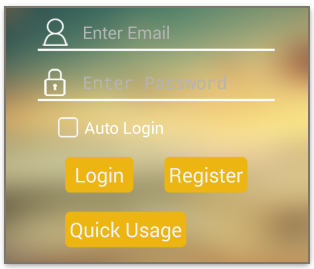
You can modify ***user_plug.h*** file to change the GPIOs, if they have been used.

2.3. Smart configuration

2.3.1. Configuring a device

When you want to operate a device with IOT app, you need to configure the device first, follow the steps below.

1. Add your mobile phone to the Wi-Fi that the device will be configured to.
2. Enter IOT App.
   - If you are a new user, touch ***Register*** to register a new account.
   - You can touch ***Quick Usage*** to operate the local devices.



Note:

If you want to operate the cloud devices, you may login in IOT app first ,for the detail of cloud device, refer to ***1.4 Local and cloud device***.

3. Login into the system with your account and password. The system shows a cloud device list and a local device list.

Note:

If you are a new user, the lists are empty. When you become a registered user, your devices can be saved, so that the status are synchronized between different smartphones, as long as you are logged in.

4. Touch the button ✚ to enter the ***Add devices*** page, and then enter the password.

SSID	What is displayed here is the SSID of the Wi-Fi to which the smartphone is connected. You can change it in Settings of your smartphone.
Show password	Choose this item to check the password you have entered. If checked，the Wifi password will be shown in plaintext.
This Wi-Fi is hidden	Choose this item if the Wi-Fi is hidden. Most of the Wi-Fis are not hidden.
Multiple devices	• If you want to configure one device, don't choose ***Multiple devices***, it takes about dozens of seconds to configure. • If you want to configure multiple devices at the same time, choose ***Multiple devices***, it takes about less than 1 minute to configure.
Activate device	Choose this item so that you can configure the device and activate it on the server-end. • If you want to configure a local device, don't choose ***Activate device***. It takes about 1 minute to configure. • If you want to configure a cloud device, choose ***Activate device***. It takes about 1 to 2 minutes to configure.

5. Turn on a device and wait until blue light flashes slowly.

Tips:

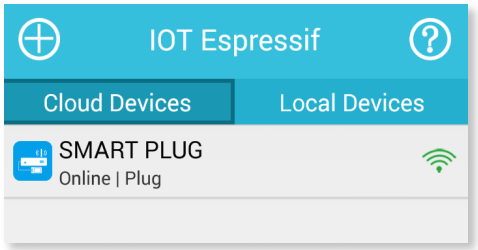
- *When the smart plug is powered on for the first time, it will enter the SMART CONFIGURATION MODE by default.*
- *THE BLUE LIGHT DOESN'T FLASH SLOWLY?*
  When you have prepared the device and you want to configure it again, then hold and press the reset button for at least 5 seconds until the blue light flashes slowly to enter the SMART CONFIGURATION MODE.
- *Different device statuses are shown as the table below.*

Smart Plug Status LED	Device status
Blue light flashes slowly	The smart plug is in the SMART CONFIGURATION MODE to be configured by IOT app.
Blue light flashes quickly	The smart plug is being configured by IOT app.
Blue light is on	The smart plug is configured by IOT app or directly connected by web browser.

Note:

The system will remember the password, so you don't need to enter the password again for the same Wi-Fi SSID if you have entered it before. Make sure the smartphone is connected to the Wi-Fi network ,or you can not add devices.

6. Touch ***OK***, and the system shows ***Configuring….***
7. When the configuration is completed, the system shows the device has been configured.
   - If the configuration is completed, the system shows ***Configuration completed***.
   - If the configuration failed, the system shows ***Configuration failed***.
8. Hold and slide down the screen to refresh the device lists.

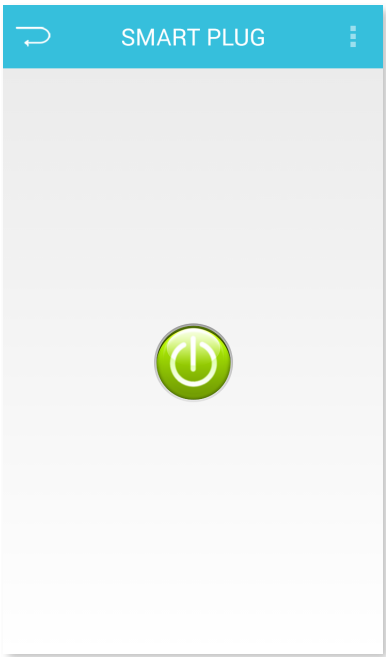


END

2.3.2. Operating a device

After a device configured to a Wi-Fi, you can use IOT app to operate it. Follow the steps below.

1. Touch ***SMART PLUG*** to see the operation page of the device.



2. Touch the  to power on/off the smart plug.
   -  : The smart plug is power off (Power LED is off).
   -  : The smart plug is power on (Power LED is on).
3. Touch the  to set the timer.

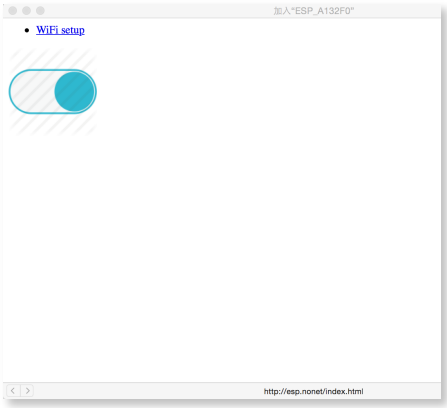
END

2.4. Directly Connection

2.4.1. Operating a device

Without using IOT app, you can operate a smart plug directly, follow the steps below.

1. Power off the smart plug.
2. Hold and press the reset button for at least 3 seconds, and then switch the smart plug without releasing the reset button.
3. Release the reset button.
   The smart plug enters the DIRECT CONNECTION MODE. and the ***Blue light is on***. (for details about the ***Smart Plug Status LED***, refer to ***2.2.4 ESP8266 / Smart plug***).
4. Connect the mobile phone or the PC into the Wi-Fi of the smart plug.
   The SSID of the smart plug is named as:
   `ESP + _ + the last 24 bit of MAC address`
   e.g. ***ESP_A132F0***
5. The browser shows the configuration page, as the URL is Http://esp.nonet/index.html.



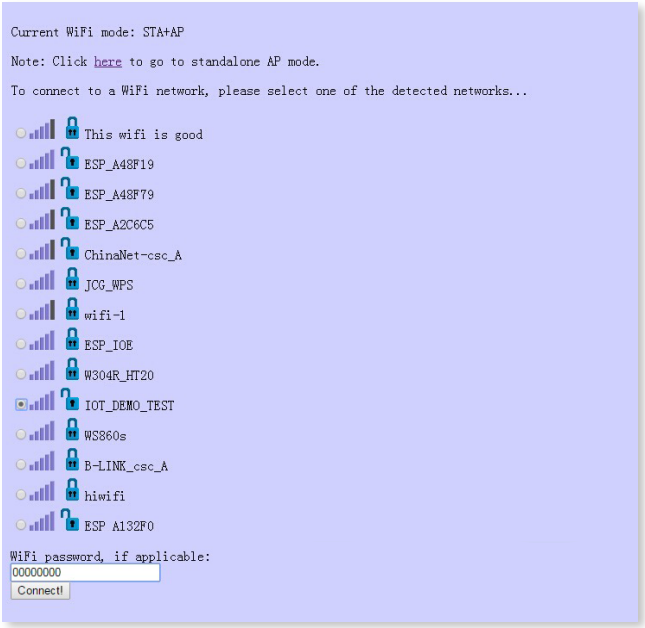
6. Click/Touch the  to turn on/off the smart plug.

END

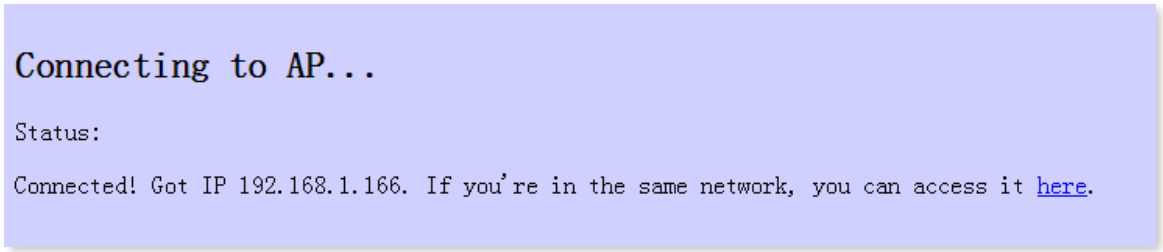
2.4.2. Configuring a device

In the DIRECT CONNECTION MODE, you can configure the device to a Wi-Fi network via web browser, follow the steps below.

1. after ***Step 5*** in ***2.4.1 Operating a device***, click/touch the ***Wi-Fi Setup*** link.
   The following pages are shown.



2. Choose a Wi-Fi SSID and enter the password.
3. Click/Touch ***Connect***.
   The following pages are shown, then You can configure this device by IOT app.



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