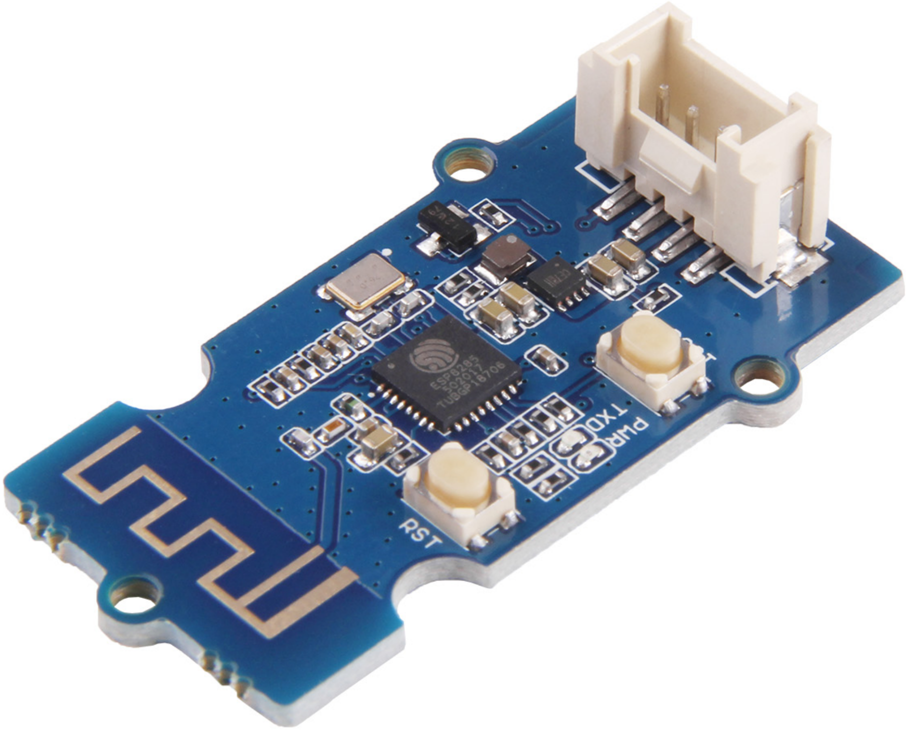
Grove - UART Wifi V2



Grove - UART WiFi is a serial transceiver module featuring the ubiquitous ESP8285 IoT SoC. With integrated TCP/IP protocol stack, this module lets your micro-controller interact with WiFi networks with only a few lines of code. Each ESP8285 module comes pre-programmed with an AT command set firmware, meaning you can send simple text commands to control the device.

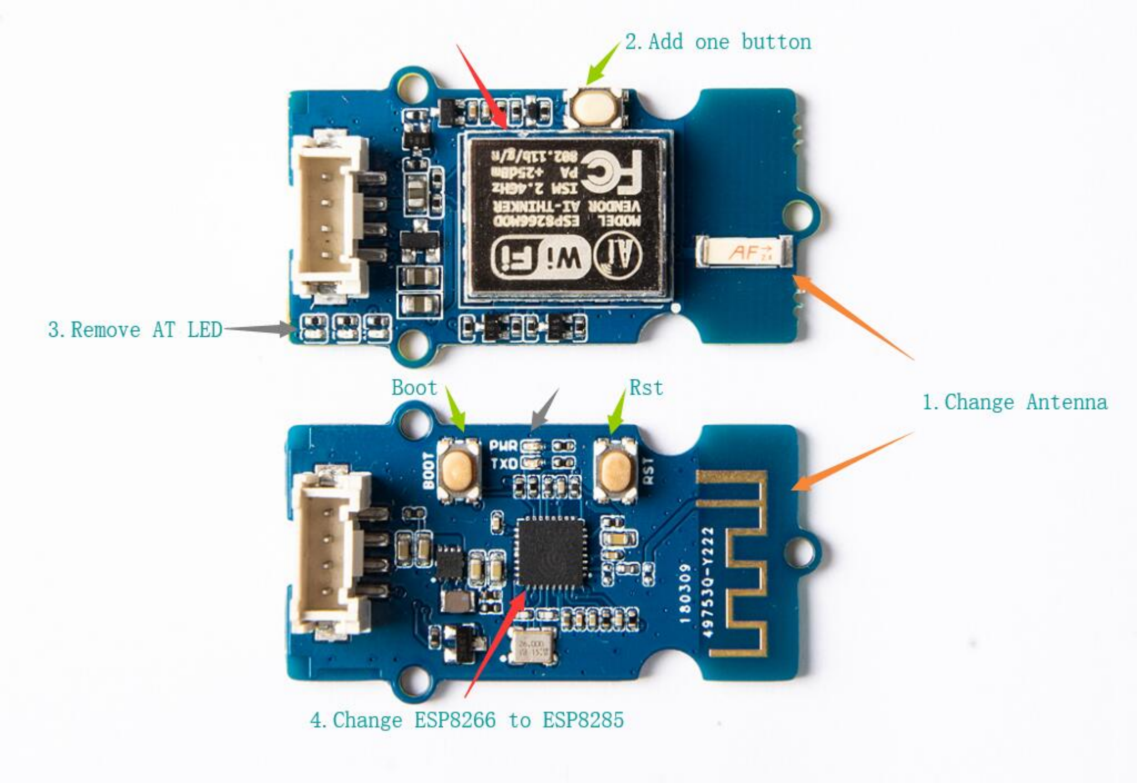
The SoC features integrated WEP, WPA/WPA2, TKIP, AES, and WAPI engines, can act as an access point with DHCP, can join existing WiFi networks and has configurable MAC and IP addresses.

Get One Now

[https://www.seeedstudio.com/Grove-UART-WiFi-V2-%28ESP8285%29-p-3054.html]

Version

Parameter	V1.0	V2.0
Product Release Date	24th Jue 2016	26th Mach 2018
WiFi Chip	ESP8266	ESP8285
Antenna Type	External	On-board
LEDs	3 LEDs-Power/WiFi/AT Command	2 LEDs- Power/WiFi
Button	1 Button: Short press to **Reset** Long press to enter **UART boot mode**	2 Buttons for those two functions



Note
You may ask what is the difference between ESP8266 and ESP8285. The ESP8285 is an update version of ESP8266, which adds a build-in 1MB flash. Except that, they are almost the same.

Features

- Grove 4-pin connector (RX,TX,VCC,GND)
- 802.11 b/g/n protocol (2.4GHz)
- WiFi Direct (P2P), soft-AP
- Supports three modes: AP, STA and AP+STA coexistence mode
- Integrated TCP/IP protocol stack
- LwIP (lightweight IP)

- Integrated low power 32-bit CPU could be reprogrammed as an application processor
- Integrated temperature sensor
- Serial UART Interface
- Multi-queue QoS management
- Wake up and transmit packets in < 2ms
- Metal shielding
- On-board ceramic antenna
- Reset switch

Tip

More details about Grove modules please refer to Grove System [https://wiki.seeedstudio.com/Grove_System/]

Specifications

- Input voltage: 3V / 5V
- Baud Rate: 115200
- Based on ESP8285 ESP-06 SoC
- AT Firmware: esp_iot_sdk_v1.1.0
    - Register red WiFi LED to the ESP8285 wifi state LED.
- AT command set
- SDIO 1.½.0, SPI, UART
- Five power states: OFF, DEEP_SLEEP, SLEEP, WAKEUP and ON.
- Standby power consumption of < 1.0mW (DTIM=3)

- Integrated TR switch, balun, LNA, power amplifier and matching network
- Integrated PLLs, regulators, DCXO and power management units
- +19.5dBm output power in 802.11b mode
- Power down leakage current of <10uA
- Hardware accelerators for CCMP (CBC-MAC, counter mode), TKIP (MIC, RC4), WAPI (SMS4), WEP (RC4), CRC
- WPA/WPA2 PSK, and WPS driver
- A-MPDU & A-MSDU aggregation & 0.4ms guard interval
- Dimensions: 25.43mm x 20.35mm

Ultra-low power technology

The ESP8285 was designed to achieve very low energy consumption with patented power management technology that reduces non-essential functions and regulates sleep patterns. There are five power states:

- OFF
- DEEP_SLEEP - the real-time clock runs but all other parts of the chip are closed
- SLEEP - consumes less than 12uA with only real-time clock and watchdog running. The chip will wake on MAC, host, RTC or external interrupt.
- WAKEUP - the system is changing from a sleep to on state. Crystal oscillator and PLL are enabled.

- ON - consumes less than 1.0mW (DTIM = 3) or 0.5mW (DTIM = 10).

The Real-time clock can be programmed to wake the ESP8285 within a specified period of time.

The higher the DTIM period, the longer the device may sleep and therefore the more power the device may potentially save.

To meet the power requirements of mobile applications and wearable electronics, to reduce the overall power consumption, the PA output power can be customised in the firmware.

Application Ideas

- Home automation
- Sensor networks
- Mesh networking
- Wearable electronics
- Baby monitor
- Network camera
- Industrial wireless control
- WiFi beacons
- Smart power plug
- Location-aware applications

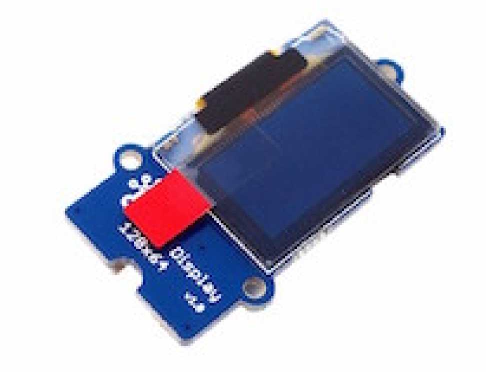
Getting Started

After this section, you can make Grove - UART WiFi run with only few steps.

Play With Arduino

Note
If this is the first time you work with Arduino, we strongly recommend you to see Getting Started with Arduino [https://wiki.seeedstudio.com/Getting_Started_with_Arduino/] before the start.

Materials required

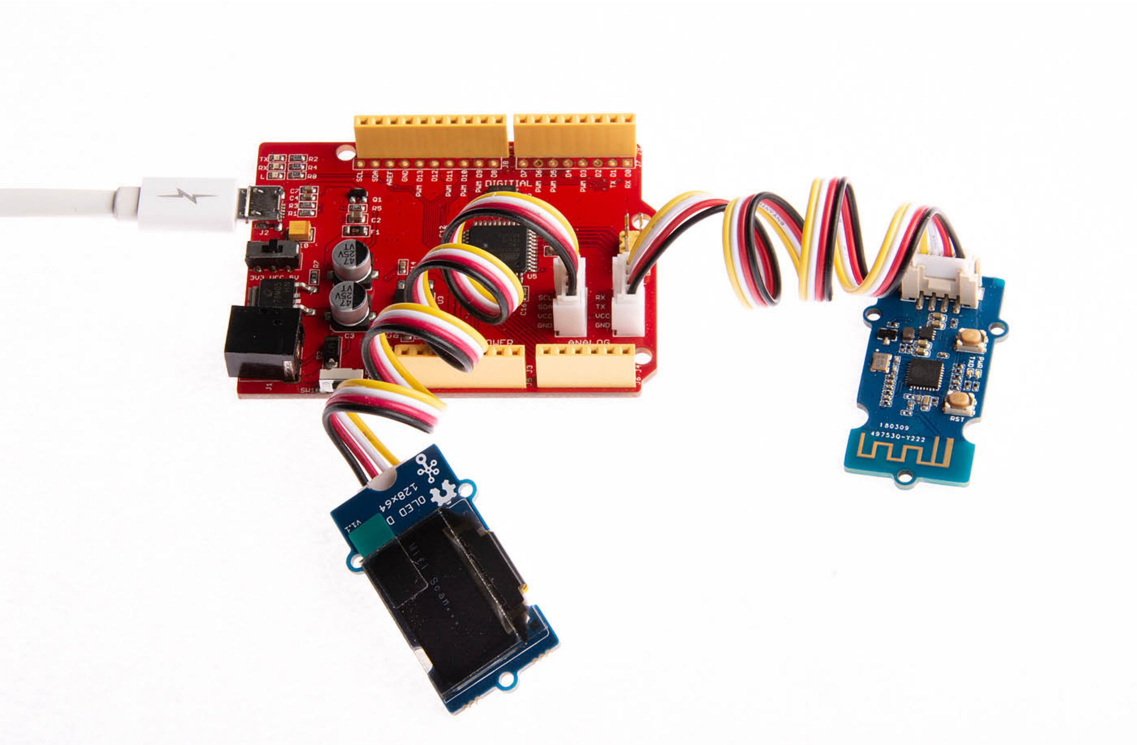
Seeeduino Lite	Grove-OLED
	
Get One Now [https://www.seeedstudio.com/Seeeduino-Lite-p-1487.html]	Get One Now [https://www.seeedstudio.com/Grov --OLED-Display-0.96%22-p-781.html]

Note
1 Please plug the USB cable gently, otherwise you may damage the port. Please use the USB cable with 4 wires inside, the 2 wires cable can't transfer data. If you are not sure about the wire you have, you can click

> here [https://www.seeedstudio.com/Micro-USB-Cable-48cm-p-1475.html] to buy
>
> **2** Each Grove module comes with a Grove cable when you buy. In case you lose the Grove cable, you can click here [https://www.seeedstudio.com/Grove-Universal-4-Pin-Buckled-20cm-Cable-%285-PCs-pack%29-p-936.html] to buy

Hardware

- **Step 1.** Connect Grove-UART Wifi to port **SERIAL** of Seeeduino Lite.
- **Step 2.** Connect Grove-OLED to port **I2C** of Seeeduino Lite.
- **Step 3.** Connect Seeeduino Lite to PC via a Micro-USB cable.



Software

- **Step 1.** Download the 128X64 OLED library [https://github.com/Seeed-

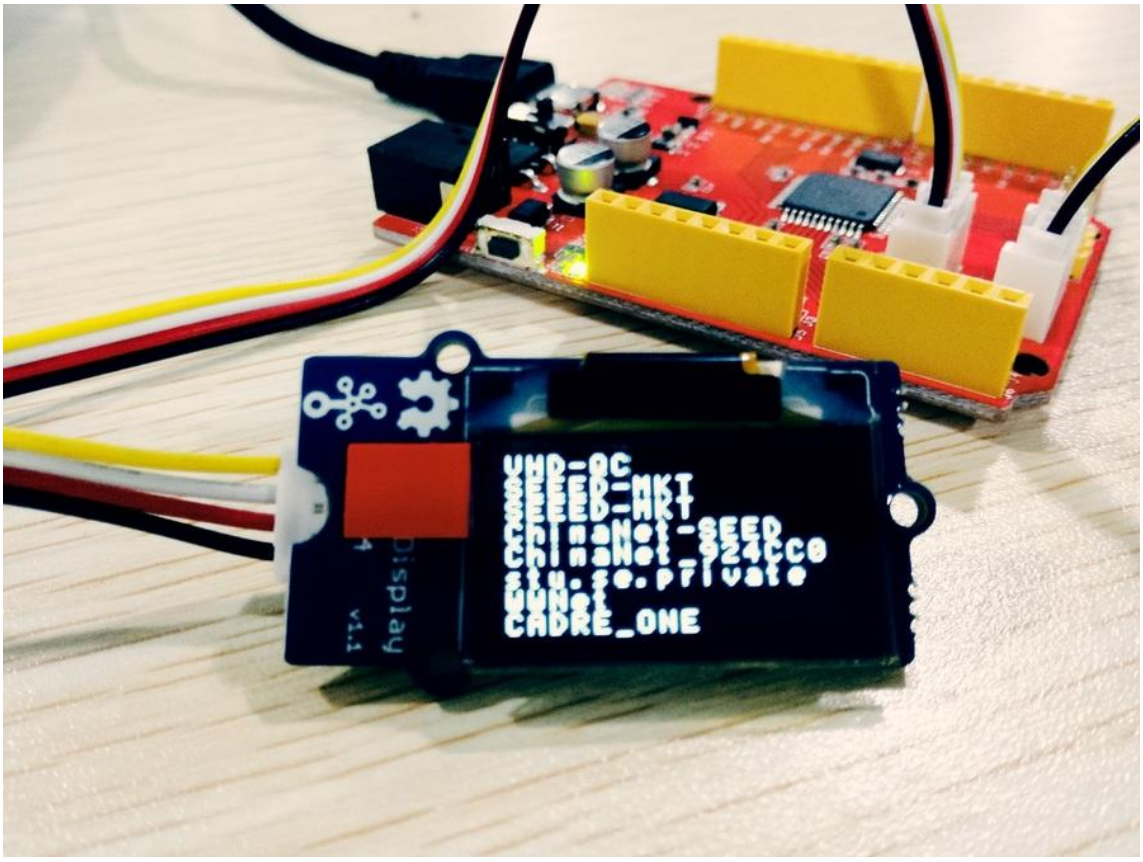
Studio/OLED_Display_128X64/archive/master.zip] from Github.

- **Step 2.** Refer to How to install library [https://wiki.seeedstudio.com/How_to_install_Arduino_Library] to install library for Arduino.
- **Step 3.** Open the Arduino IDE and copy the following code into a new sketch.

```
// test grove - uart wifi
// scan ap and display on Grove - OLED 0.96'
// Loovee @ 2015-7-28

#include <Wire.h>
#include <SeeedOLED.h>

char ap_buf[30][16];
int ap_cnt = 0;

void setup()
{
    Serial1.begin(115200);

    delay(3000);
    Wire.begin();
    SeeedOled.init();                       // initialze SE

    SeeedOled.clearDisplay();               // clear the sc
    SeeedOled.setNormalDisplay();           // Set display
    SeeedOled.setPageMode();                // Set addressi

}


void loop()
{
    ap_cnt = 0;
    SeeedOled.clearDisplay();
    SeeedOled.setTextXY(3,0);
    SeeedOled.putString("Wifi Scan...");

    cmd_send("AT+CWLAP");
    wait_result();

    display_ap();
    delay(5000);
}

// send command
void cmd_send(char *cmd)
{
    if(NULL == cmd)return;
    Serial1.println(cmd);
}


// wait result of ap scan
// +CWLAP:(3,"360WiFi-UZ",-81,"08:57:00:01:61:ec",1)
void wait_result()
{
    while(1)
    {
LOOP1:
        char c1=0;
        if(Serial1.available()>=2)
        {
            c1 = Serial1.read();
            if(c1 == 'O' && 'K' == Serial1.read())retur
        }

        if('('==c1)
        {
            while(Serial1.available()<3);
            Serial1.read();
            Serial1.read();
            Serial1.read();

            int d = 0;
            while(1)
            {
                if(Serial1.available() && '"' == Serial
                {
                    while(1)
                    {
                        if(Serial1.available())
                        {
                            char c = Serial1.read();
                            ap_buf[ap_cnt][d++] = c;
                            if(c == '"' || d==16)
                            {
                                ap_buf[ap_cnt][d-1] = '
                                ap_cnt++;
                                goto LOOP1;
                            }
                        }
                    }
                }
            }
        }
    }
}

// display
void display_ap()
{
    char strtmp[16];
    sprintf(strtmp, "get %d ap", ap_cnt);

    SeedOled.clearDisplay();            // clear
    SeedOled.setTextXY(3,3);            // Set the curs
    SeedOled.putString(strtmp);         // Print the St

    delay(2000);

    int cnt = ap_cnt;
    int offset = 0;
    while(1)
    {
        SeedOled.clearDisplay();
        if(cnt>=8)
        {
            for(int i=0; i<8; i++)
            {
                SeeedOled.setTextXY(i,0);           //
                SeeedOled.putString(ap_buf[8*offset+i])
            }
            cnt-=8;
            offset++;
        }
        else
        {
            for(int i=0; i<cnt; i++)
            {
                SeeedOled.setTextXY(i,0);           //
                SeeedOled.putString(ap_buf[8*offset+i])
            }

            return;
        }

        delay(2000);
    }
}
```

- **Step 4.** Upload the demo. If you do not know how to upload the code, please check How to upload code [https://wiki.seeedstudio.com/Upload_Code/].

Then you will see the OLED show the wifi AP around you.



```
UMD-AC
SEEED-MKT
SEEED-MKT
ChinaNet-SEED
ChinaNet_924CC0
stu.fe.private
WWNet
CADRE_ONE
```

Firmware update

Our module board got a firmware burned into it for factory settings, you can burn other firmware to it if you like. Click here [https://files.seeedstudio.com/wiki/Grove-Uart_Wifi/res/Grove-Uart_Wifi_Firmware-code.zip] to download source code of factory setting firmware.

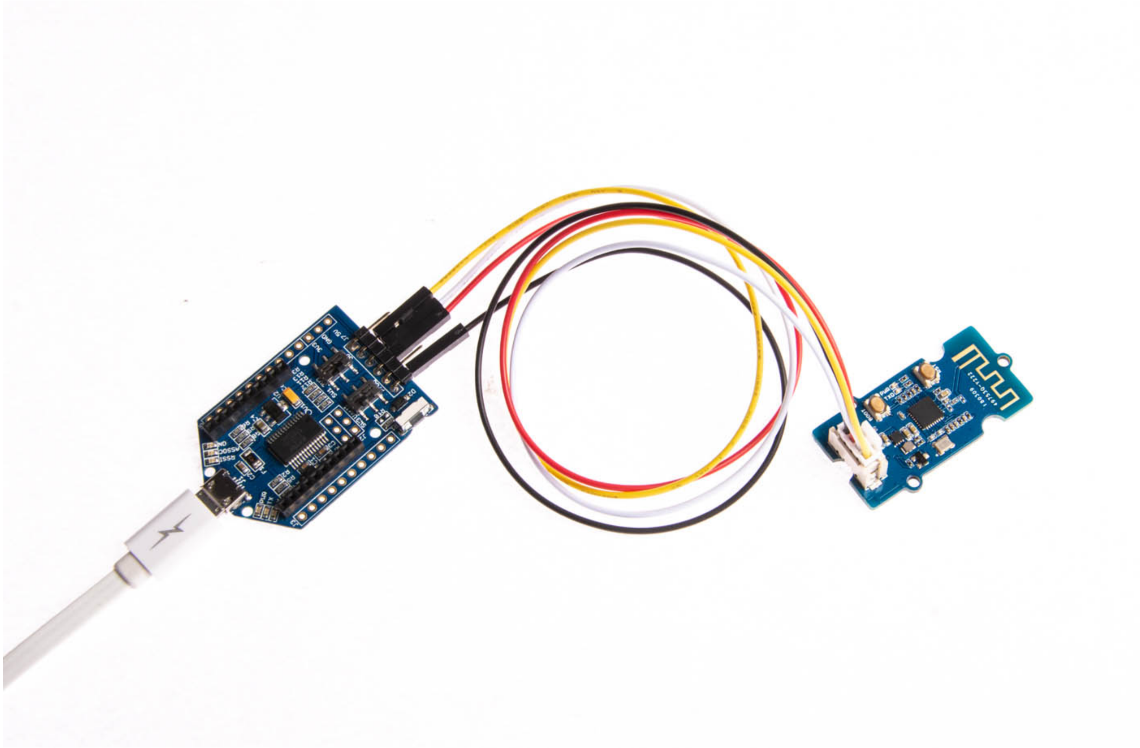
Materials required

- A USB to serial converter is required for firmware updating, you can choose UartSBee V5 [https://www.seeedstudio.com/UartSBee-V5-p-1752.html] if you don't know where to get one.

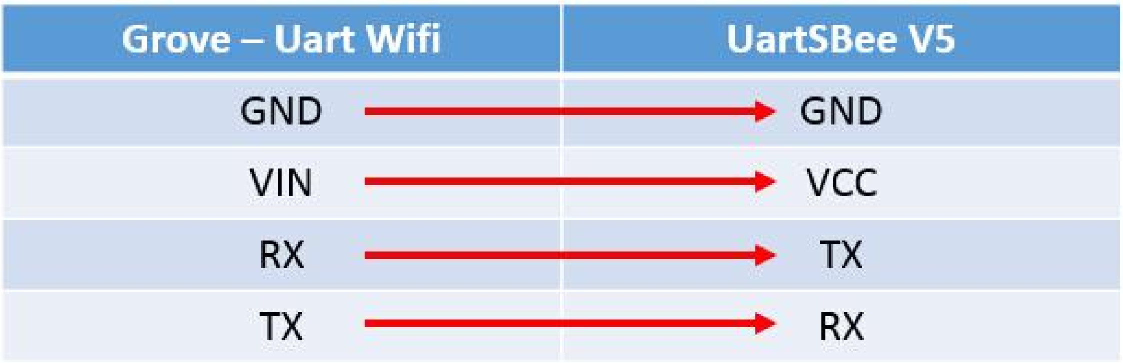
- A Grove-Jump converting cable [https://www.seeedstudio.com/Grove-4-pin-Female-Jumper-to-Grove-4-pin-Conversion-Cable-%285-PCs-per-PAck%29-p-1020.html] is required and we also offered for sale.
- A micro USB cable(type A to type C) is required.

Hardware

Step 1. Connect one end of Grove-Jump converting cable with grove socket on Grove - Uart Wifi and connect other end with UartSBee V5 which shown as following.



Step 2. Then connecting cables like following figure:



Grove – Uart Wifi	UartSBee V5
GND	GND
VIN	VCC
RX	TX
TX	RX

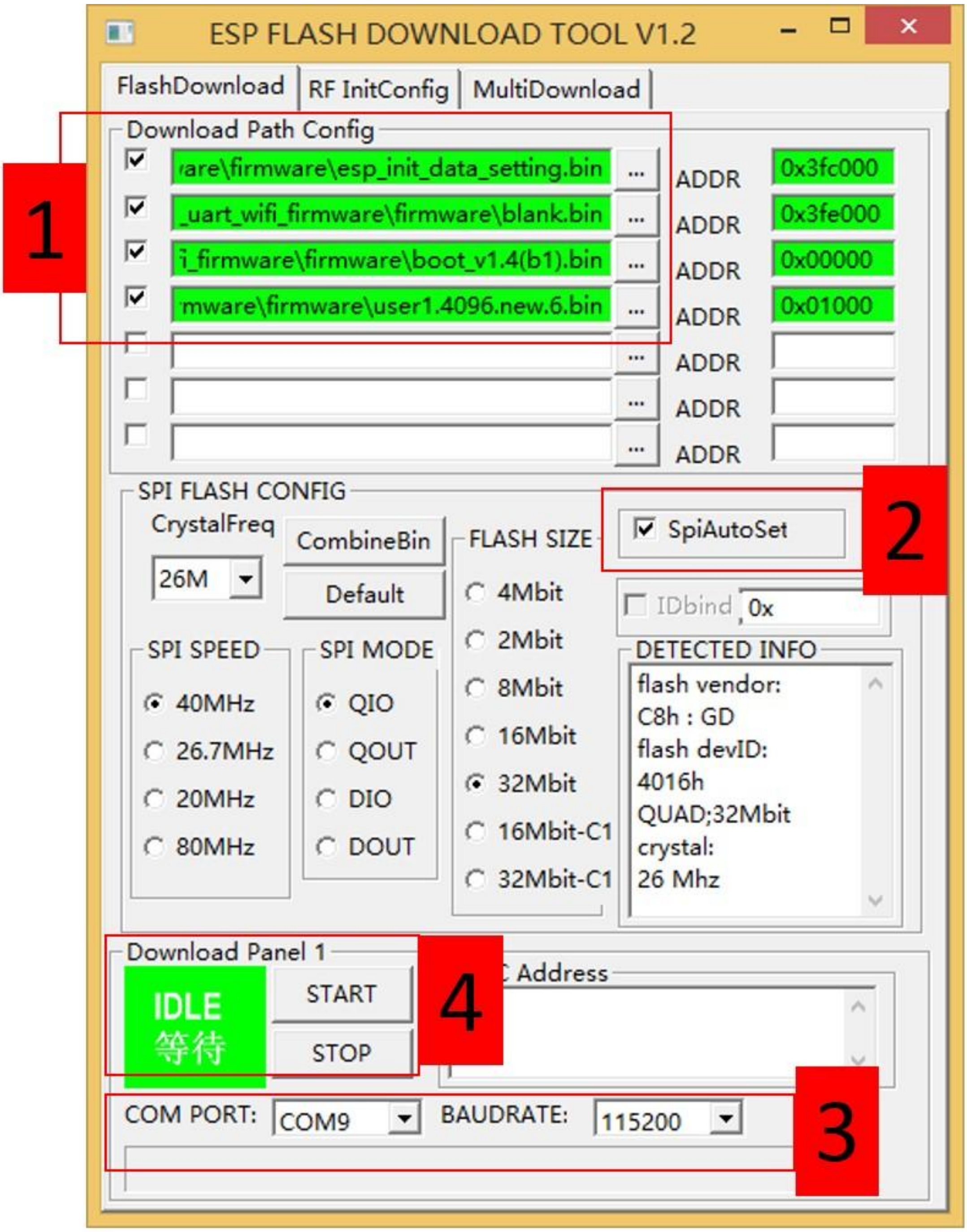
Software

Step 1. Download burning tool and firmware

- FLASH DOWNLOAD TOOLS [https://files.seeedstudio.com/wiki/Grove-Uart_Wifi/res/FLASH_DOWNLOAD_TOOLS_v1.2_150512.zip]
- Bin files of firmware [https://files.seeedstudio.com/wiki/Grove-Uart_Wifi/res/Grove-uart-wifi-firmware-bin.zip]

Step 2. Press and hold button until the red LED indicator turn on which means it is ready to burn firmware.

Step 3. Start executable files in FLASH DOWNLOAD TOOLS files (double click) to make configurations like following steps:



Download Path Config

☑	are\firmware\esp_init_data_setting.bin	ADDR	0x3fc000
☑	_uart_wifi_firmware\firmware\blank.bin	ADDR	0x3fe000
☑	i_firmware\firmware\boot_v1.4(b1).bin	ADDR	0x00000
☑	mware\firmware\user1.4096.new.6.bin	ADDR	0x01000
□		ADDR	
□		ADDR	
□		ADDR	

SPI FLASH CONFIG

CrystalFreq: 26M

SPI SPEED: ● 40MHz ○ 26.7MHz ○ 20MHz ○ 80MHz

SPI MODE: ● QIO ○ QOUT ○ DIO ○ DOUT

FLASH SIZE: ○ 4Mbit ○ 2Mbit ○ 8Mbit ○ 16Mbit ● 32Mbit ○ 16Mbit-C1 ○ 32Mbit-C1

☑ SpiAutoSet

□ IDbind 0x

DETECTED INFO

flash vendor:
C8h : GD
flash devID:
4016h
QUAD;32Mbit
crystal:
26 Mhz

Download Panel 1

IDLE
等待

Address

COM PORT: COM9 BAUDRATE: 115200

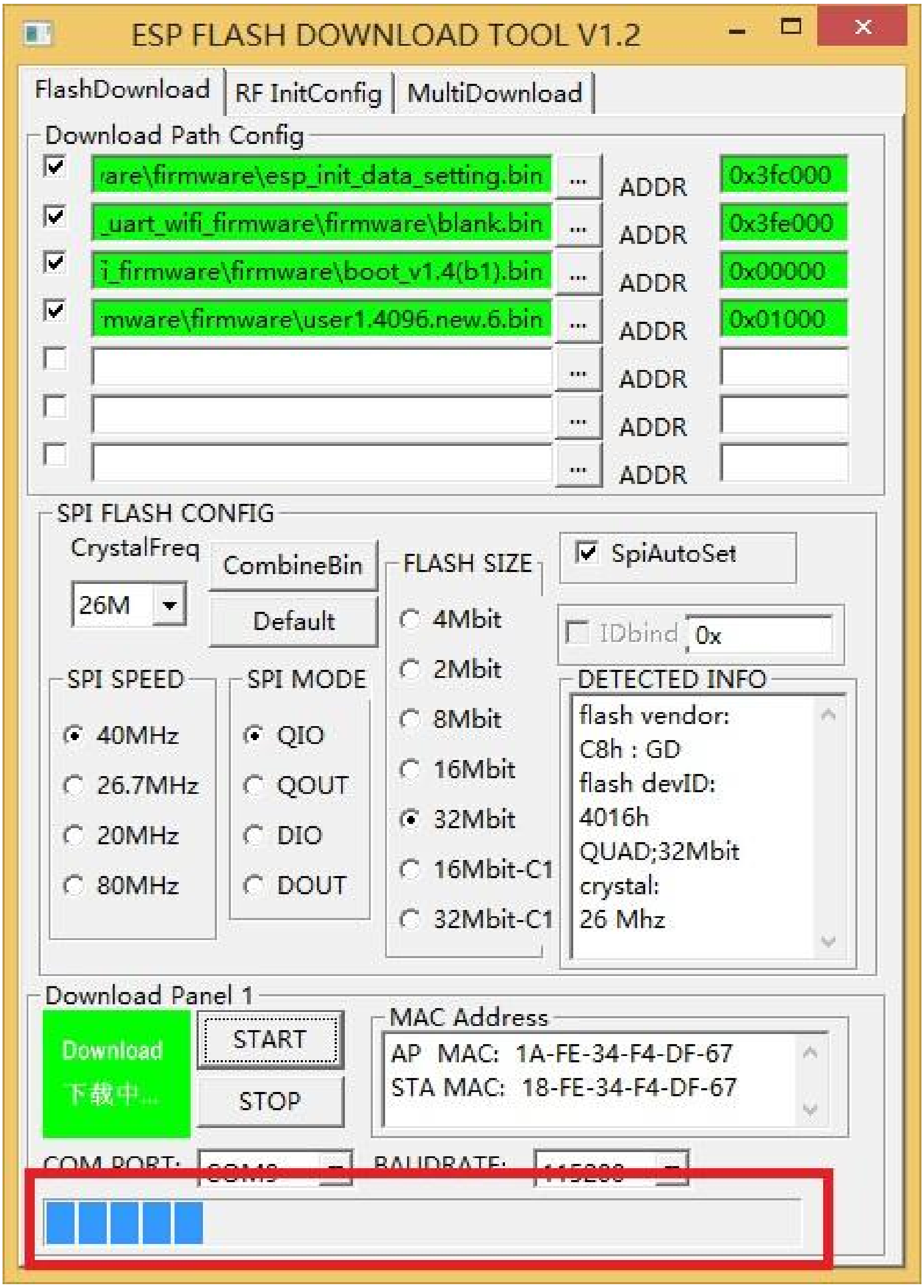
1. Choose desired files from firmware bin file downloaded.

2. Select the **SpiAutoSet** checkbox.

3. Choose COM port and BAUDRATE.

4. Click **START** button

- Progress bar will be displayed in firmware-burning process.



ESP FLASH DOWNLOAD TOOL V1.2

FlashDownload | RF InitConfig | MultiDownload

Download Path Config

☑	are\firmware\esp_init_data_setting.bin	ADDR	0x3fc000
☑	_uart_wifi_firmware\firmware\blank.bin	ADDR	0x3fe000
☑	i_firmware\firmware\boot_v1.4(b1).bin	ADDR	0x00000
☑	mware\firmware\user1.4096.new.6.bin	ADDR	0x01000
□		ADDR	
□		ADDR	
□		ADDR	

SPI FLASH CONFIG

CrystalFreq: 26M

CombineBin | Default

FLASH SIZE: ○ 4Mbit ○ 2Mbit ○ 8Mbit ○ 16Mbit ● 32Mbit ○ 16Mbit-C1 ○ 32Mbit-C1

☑ SpiAutoSet

□ IDbind 0x

SPI SPEED: ● 40MHz ○ 26.7MHz ○ 20MHz ○ 80MHz

SPI MODE: ● QIO ○ QOUT ○ DIO ○ DOUT

DETECTED INFO

flash vendor:
C8h : GD
flash devID:
4016h
QUAD;32Mbit
crystal:
26 Mhz

Download Panel 1

Download
下载中...

START | STOP

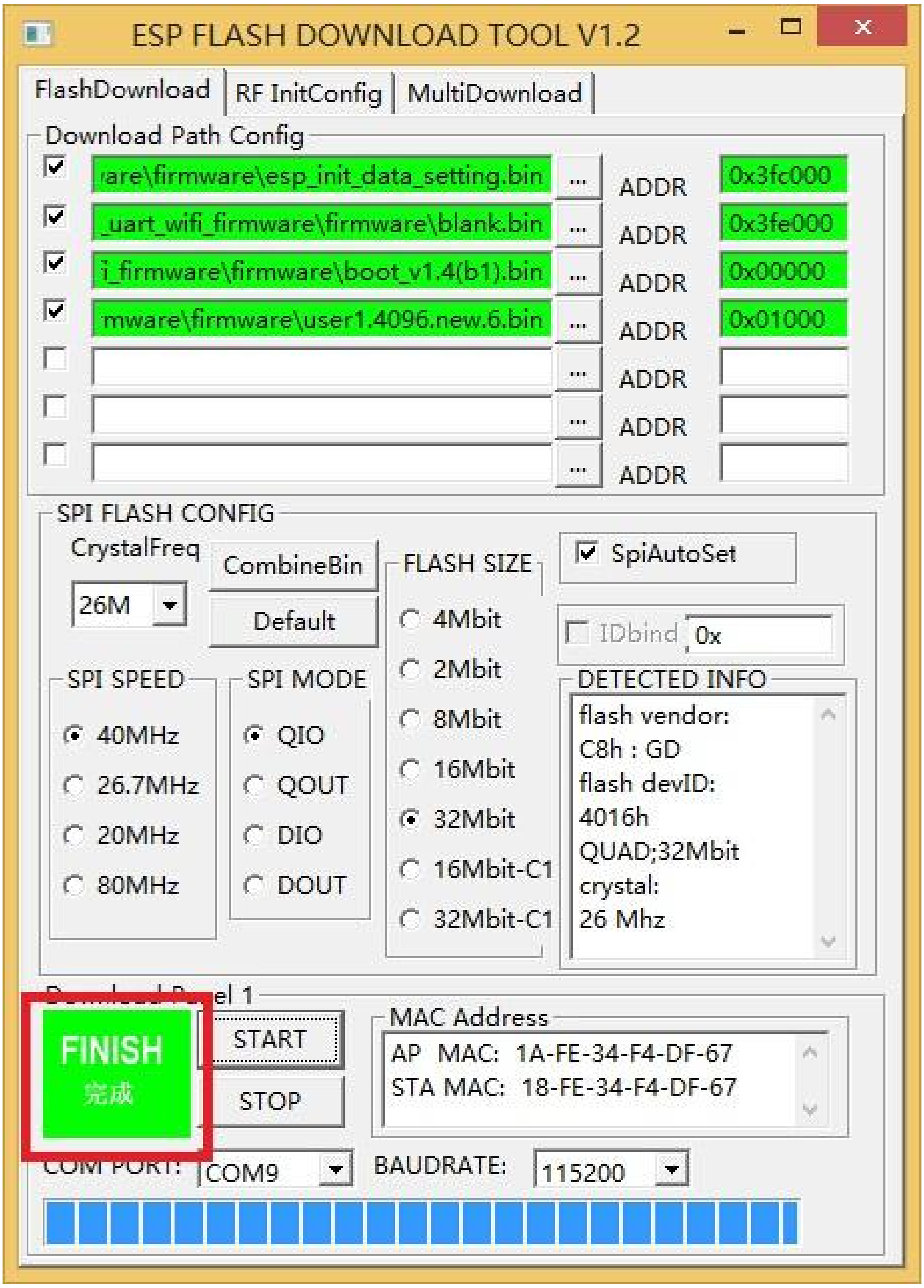
MAC Address

AP MAC: 1A-FE-34-F4-DF-67
STA MAC: 18-FE-34-F4-DF-67

COM PORT: COM3

BAUDRATE: 115200

- Finally, firmware-burning is done.



Download Path Config

☑	are\firmware\esp_init_data_setting.bin	ADDR	0x3fc000
☑	_uart_wifi_firmware\firmware\blank.bin	ADDR	0x3fe000
☑	i_firmware\firmware\boot_v1.4(b1).bin	ADDR	0x00000
☑	mware\firmware\user1.4096.new.6.bin	ADDR	0x01000
□		ADDR	
□		ADDR	
□		ADDR	

SPI FLASH CONFIG

CrystalFreq: 26M

SPI SPEED: ● 40MHz ○ 26.7MHz ○ 20MHz ○ 80MHz

SPI MODE: ● QIO ○ QOUT ○ DIO ○ DOUT

FLASH SIZE: ○ 4Mbit ○ 2Mbit ○ 8Mbit ○ 16Mbit ● 32Mbit ○ 16Mbit-C1 ○ 32Mbit-C1

☑ SpiAutoSet

□ IDbind 0x

DETECTED INFO
flash vendor:
C8h : GD
flash devID:
4016h
QUAD;32Mbit
crystal:
26 Mhz

Download Panel 1

MAC Address
AP MAC: 1A-FE-34-F4-DF-67
STA MAC: 18-FE-34-F4-DF-67

COM PORT: COM9 BAUDRATE: 115200

AT Commands

Quick start of AT Commands

Hardware

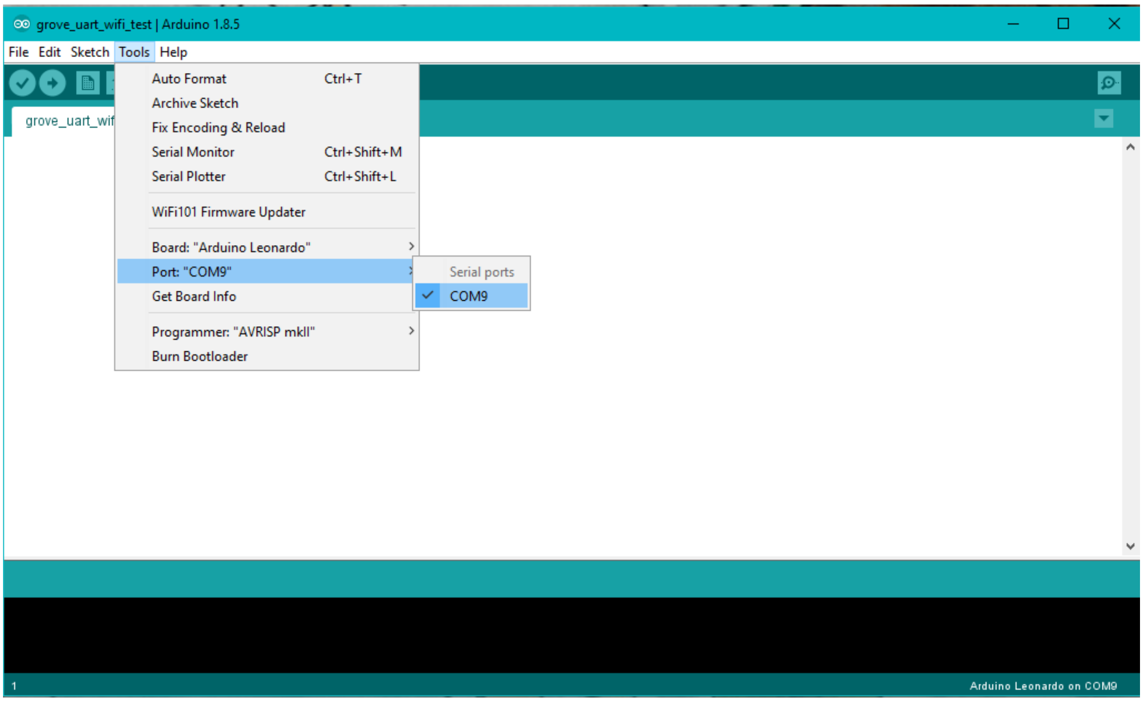
The **Materials required** and **Hardware connection** are the same as Firmware update [https://wiki.seeedstudio.com/Grove-UART_Wifi/#firmware-update]

Let's go to software part

Software

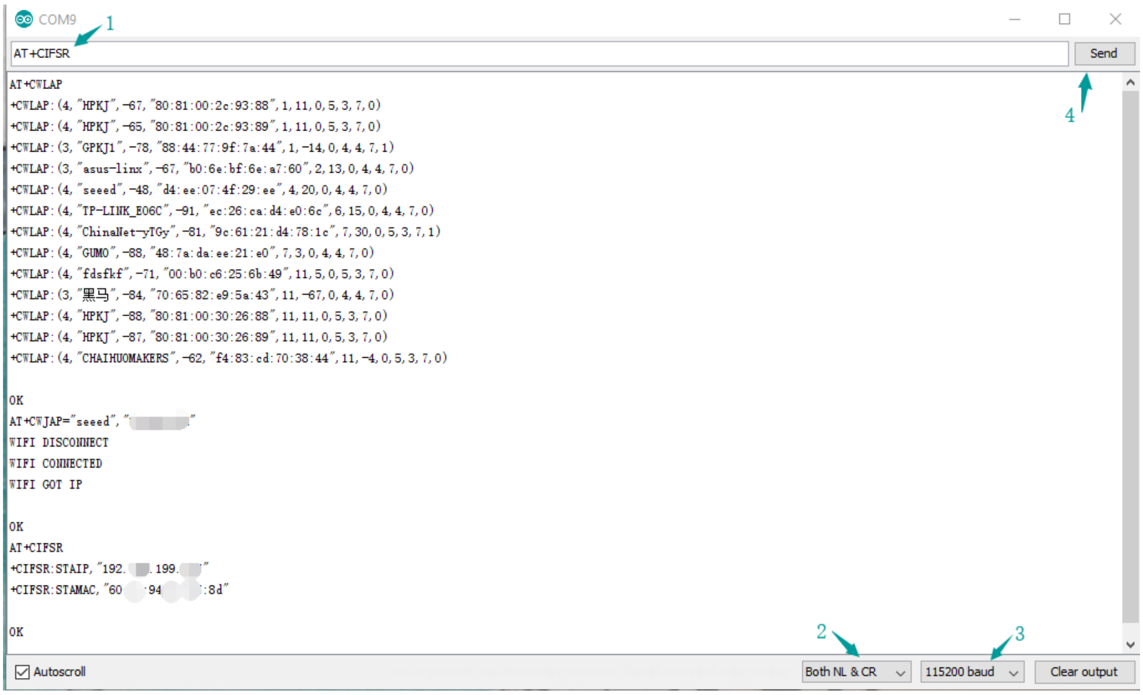
You can use any serial Tools you like, we use Arduino here. And please make sure you have connect the **USB to serial converter** to your PC.

Step 1. Open the Arduino IDE, Click **Tools** choose the corresponding **Port**.



Step 2. Then click the button on the upper right corner to open the **Serial Monitor** of Arduino.

Step 3. Set the Serial Monitor as the following picture. Particularly :**2-** Select **Both NL & CR**, **3-**Set the **baud rate** to 115200



```
AT+CIFSR
```

```
AT+CWLAP
+CWLAP:(4,"HPKJ",-67,"80:81:00:2c:93:88",1,11,0,5,3,7,0)
+CWLAP:(4,"HPKJ",-65,"80:81:00:2c:93:89",1,11,0,5,3,7,0)
+CWLAP:(3,"GPKJ1",-78,"88:44:77:9f:7a:44",1,-14,0,4,4,7,1)
+CWLAP:(3,"asus-linx",-67,"b0:6e:bf:6e:a7:60",2,13,0,4,4,7,0)
+CWLAP:(4,"seeed",-48,"d4:ee:07:4f:29:ee",4,20,0,4,4,7,0)
+CWLAP:(4,"TP-LINK_E06C",-91,"ec:26:ca:d4:e0:6c",6,15,0,4,4,7,0)
+CWLAP:(4,"ChinaNet-yTGy",-81,"9c:61:21:d4:78:1c",7,30,0,5,3,7,1)
+CWLAP:(4,"GUMO",-88,"48:7a:da:ee:21:e0",7,3,0,4,4,7,0)
+CWLAP:(4,"fdsfkf",-71,"00:b0:c6:25:6b:49",11,5,0,5,3,7,0)
+CWLAP:(3,"黑马",-84,"70:65:82:e9:5a:43",11,-67,0,4,4,7,0)
+CWLAP:(4,"HPKJ",-88,"80:81:00:30:26:88",11,11,0,5,3,7,0)
+CWLAP:(4,"HPKJ",-87,"80:81:00:30:26:89",11,11,0,5,3,7,0)
+CWLAP:(4,"CHAIHUOMAKERS",-62,"f4:83:cd:70:38:44",11,-4,0,5,3,7,0)

OK
AT+CWJAP="seeed","[redacted]"
WIFI DISCONNECT
WIFI CONNECTED
WIFI GOT IP

OK
AT+CIFSR
+CIFSR:STAIP,"192.[redacted].199.[redacted]"
+CIFSR:STAMAC,"60[redacted]:94[redacted]:8d"

OK
```

☑ Autoscroll   Both NL & CR   115200 baud

Step 4. Tap the AT command you need in the **1- command line** then click the **4- Send** button. You will see the return information as the picture above.

Basic AT Commands

Command	Description
AT	Test AT startup
AT+RST	Restart module
AT+GMR	View version info
AT+GSLP	Enter deep-sleep mode
ATE	Enable/Disable AT commands echo
AT+RESTORE	Factory Reset
AT+UART	UART configuration(Deprecated)
AT+UART_CUR	UART current configuration (Won't save to Flash)
AT+UART_DEF	UART default configuration (Save to Flash)
AT+SLEEP	Sleep mode
AT+RFPOWER	Set RF TX Power
AT+RFVDD	Set RF TX Power according to VDD33

WiFi AT Commands

Command	Description
AT+CWMODE	WIFI mode (Deprecated)
AT+CWMODE_CUR	Current WIFI mode (Won't save to Flash)

Command Description

Command	Description
AT+CWMODE_CUR	Current WiFi mode (Won't save to Flash)
AT+CWMODE_DEF	Default WIFI mode (Save to Flash)
AT+CWJAP	Connect to AP (Deprecated)
AT+CWJAP_CUR	Current Connect to AP (Won't save to Flash)
AT+CWJAP_DEF	Default Connect to AP (Save to Flash)
AT+CWLAP	Lists available APs
AT+CWQAP	Disconnect from AP
AT+CWSAP	Configure softAP (Deprecated)
AT+CWSAP_CUR	Configure current softAP (Won't save to Flash)
AT+CWSAP_DEF	Configure default softAP (Save to Flash)
AT+CWLIF	List stations connected to softAP
AT+CWDHCP	Enable/Disable DHCP (Deprecated)
AT+CWDHCP_CUR	Current Enable/Disable DHCP (Won't save to Flash)
AT+CWDHCP_DEF	Default Enable/Disable DHCP (Save to Flash)
AT+CWAUTOCONN	Connect to AP automatically when power on
AT+CIPSTAMAC	Set station mac address (Deprecated)
AT+CIPSTAMAC_CUR	Set station mac address (Won't save to Flash)
AT+CIPSTAMAC_DEF	Set station mac address (Save to Flash)

AT+CIPAPMAC	Set softAP mac address (Deprecated)
AT+CIPAPMAC_CUR	Set softAP mac address (Won't save to Flash)
AT+CIPAPMAC_DEF	Set softAP mac address (Save to Flash)
AT+CIPSTA	Set station IP address (Deprecated)
AT+CIPSTA_CUR	Set station IP address (Won't save to Flash)
AT+CIPSTA_DEF	Set station IP address (Save to Flash)
AT+CIPAP	Set softAP IP address (Deprecated)
AT+CIPAP_CUR	Set softAP IP address (Won't save to Flash)
AT+CIPAP_DEF	Set softAP IP address (Save to Flash)
AT+CWSTARTSMART	Start SmartConfig
AT+CWSTOPSMART	Stop SmartConfig

TCP/IP AT Commands

Command	Description
AT+CIPSTATUS	Get connection status
AT+CIPSTART	Establish TCP connection or register UDP port
AT+CIPSEND	Send data
AT+CIPSENDEX	Send data, if or "\0" is met, data will be sent

Command Description

AT+CIPSENDBUF	Write data into TCP-send-buffer
AT+CIPBUFRESET	Reset segment ID count
AT+CIPBUFSTATUS	Check status of TCP-send-buffer
AT+CIPCHECKSEQ	Check if a specific segment is sent or not
AT+CIPCLOSE	Close TCP/UDP connection
AT+CIFSR	Get local IP address
AT+CIPMUX	Set multiple connections mode
AT+CIPSERVER	Configure as server
AT+CIPMODE	Set transmission mode
AT+SAVETRANSLINK	Save transparent transmission link to Flash
AT+CIPSTO	Set timeout when ESP8266 runs as TCP server
AT+CIUPDATE	Upgrade firmware through network
AT+PING	Ping an IP address or hostname

Schematic Online Viewer

Resources

- **[PDF]** Schematic in PDF [https://files.seeedstudio.com/wiki/Grove-Uart_Wifi/res/Grove%20-%20Uart%20Wifi%20v2%20sch.pdf]
- **[Zip]** Schematic in Eagle [https://files.seeedstudio.com/wiki/Grove-Uart_Wifi/res/Uart_Wifi_V2_Eagle_file.zip]

- **[Datasheet]** Espressif Systems ESP8285 [https://files.seeedstudio.com/wiki/Grove-Uart_Wifi/res/ESP8285_datasheet.pdf]
- **[PDF]** Espressif Systems ESP8266 AT Instruction Set - v0.24 [http://bbs.espressif.com/download/file.php?id=450]
- **[MoreReading]** http://www.esp8266.com [http://www.esp8266.com]
- **[MoreReading]** ESP-06 [http://www.esp8266.com/wiki/doku.php?id=esp8266-module-family#esp-06]
- **[MoreReading]** ESP8266 on Hackaday [http://hackaday.com/tag/esp8266/]
- **[MoreReading]** https://nurdspace.nl/ESP8266 [https://nurdspace.nl/ESP8266]

Tech Support

Please submit any technical issue into our forum [https://forum.seeedstudio.com/].

[https://www.seeedstudio.com/act-4.html?

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