

The W600 Module is a cost-effective 2.4GHz WiFi module support 802.11b/g/n. Seeed W600 Module is based on the W600 chip which features ARM Cortex-M3 with 1MB on-chip flash and freeRTOS kernel.

We take the pins of the W600 chip out and put them on the back of the board, including I2S/I2C/SPI/GPIO/PWM/UART/SDIO. In addition, this module has an on-board PCB Antenna, no need to design the antenna separately, so you can quickly deploy the module to your own board. We also have made CE/FCC certification for this module and you can use it directly for business projects.

Features

- Integrated 32bit Embedded Cortex-M3 CPU, operating frequency 80MHz
- Integrated 288KB RAM
- Integrated 1MB FLASH

Interface

- Integrated GPIO device controller
- Integrated 2 UART interface, support RTS/CTS, baud rate: 1200bps~2Mbps
- Integrated one high speed SPI controller, operating frequency: 0~50MHz;

Wireless

- Support IEEE802.11 b/g/e/i/d/k/r/s/w/n
- Support 2.4~2.4835 GHz
- Support Wi-Fi WMM/WMM-PS/WPA/WPA2/WPS
- Support Wi-Fi Direct
- STBC、GreenField、Short-GI
- Support multiple network protocols: TCP/UDP/ICMP/DHCP/DNS/HTTP

Others

- Supports AT+ instruction protocol based on ASCII encoding (UART interface)
- Support for user-programmable GPIO control
- On-board Antenna

Specification

Category	Item	Parameter
Wireless	Support Wi-Fi Mode	IEEE802.11b/g/n
	RF system impedance	50Ω
	Frequency Range	2.4~2.4835 GHz
	Receiving sensitivity	20MHz MCS7@-71dBm; 40MHz MCS7@-68dBm; 54Mbps@-73dBm; 11Mbps@-86dBm; 1Mbps@-95dBm;
	Physical layer data rate	802.11n MCS 0~7 150Mbps
	Modulation	DSSS、OFDM、DBPSK、DQPSK、CCK、QAM16/64
	Output Power (Declaration for EU)	IEEE802.11b, POUT = +14.72dBm; IEEE802.11g, POUT = +10.34dBm; IEEE802.11n, POUT = +10dBm
Hardware	Interface Type	UART/SPI/GPIO
	Interface rate	2Mbps@UART (Max) 50Mbps@SPI (Max)
	Operating Voltage	3.3V(Module)/5V(Development Board)
	Operating humidity	5%~90% (No condensation)
	Operating temperature	0 ~ +50°C
Software	Network Type	STA/AP/AP+STA/Wi-Fi Direct
	Verification	WEP/WPA-PSK/WPA2-PSK
	Encryption	WEP64/WEP128/TKIP/CCMP(AES)
	WPS Function	WPS
	Energy saving	PS-POLL/Standby
	Network protocol	TCP/UDP/ARP/ICMP/DHCP/DNS/HTTP
	Interface Protocol	AT+ instruction set

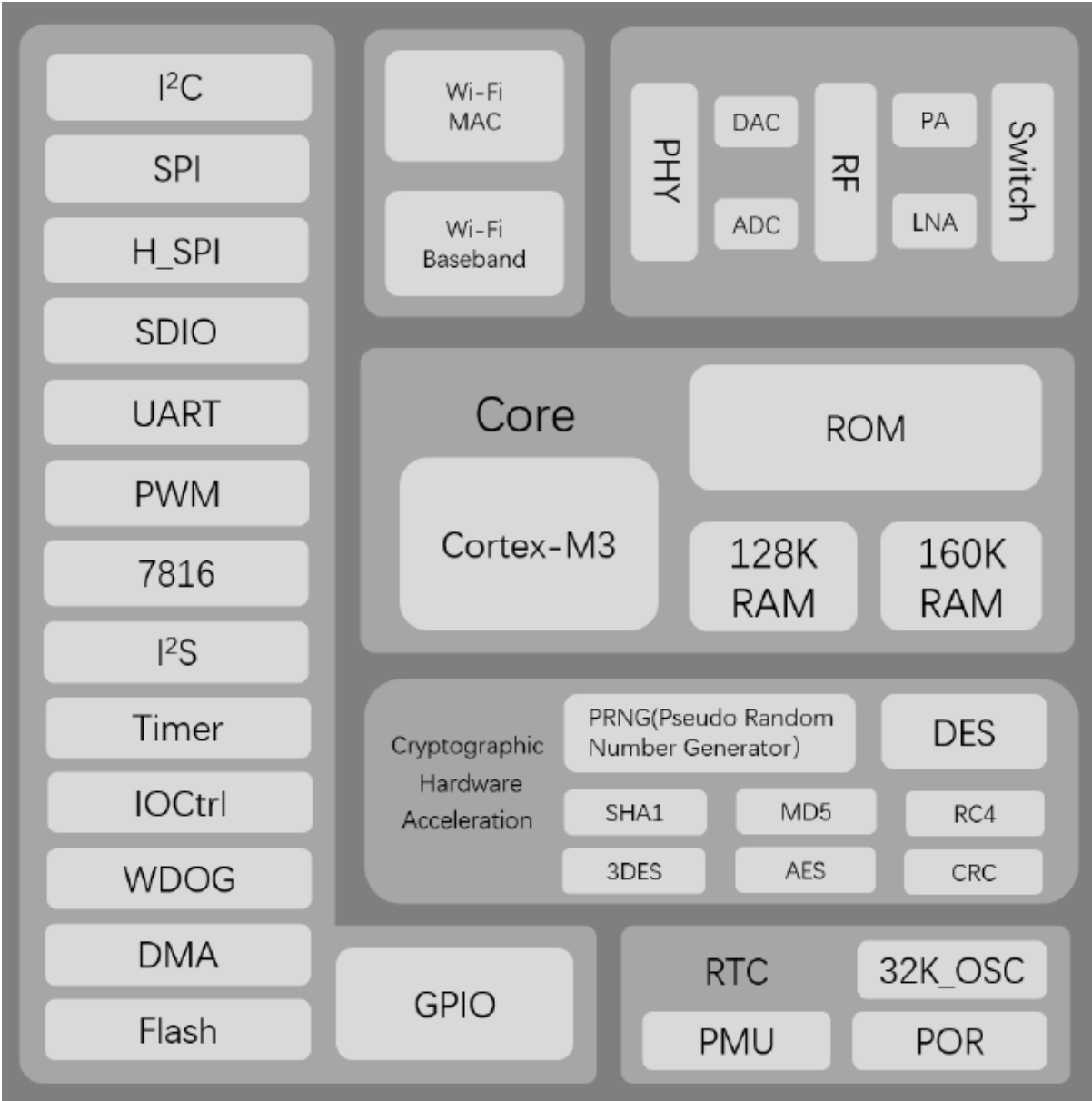
For more detail about specifications, please check the W600 [Specification V1.0.0_EN.pdf](#) and [W600 HardwareDesignGuide_v1.0.1.pdf](#)

Typical Applications

- intelligent home appliances
- smart home
- wireless audio and video
- smart toys
- medical monitoring
- industrial control
- other Internet of Things applications

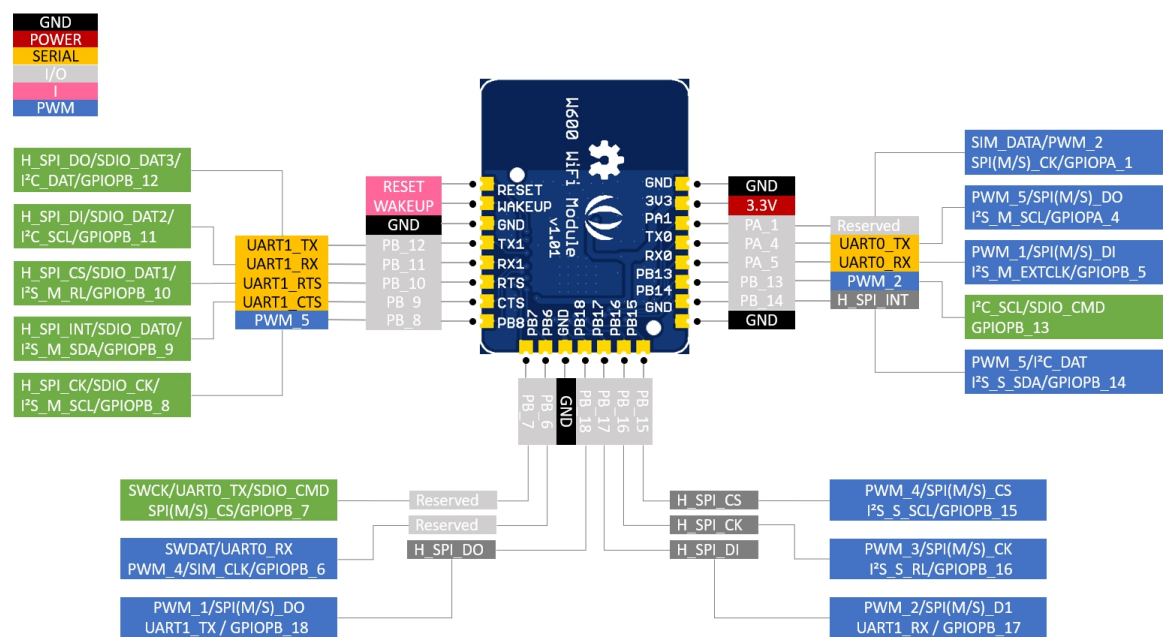
Hardware Overview

Block Diagram



[click to see the clearer original file](#)

Pinout



Note
The first level is the pin name
The second level is the default pin function
The third level is the multiplexed pin function

[click to see the clearer original file](#)

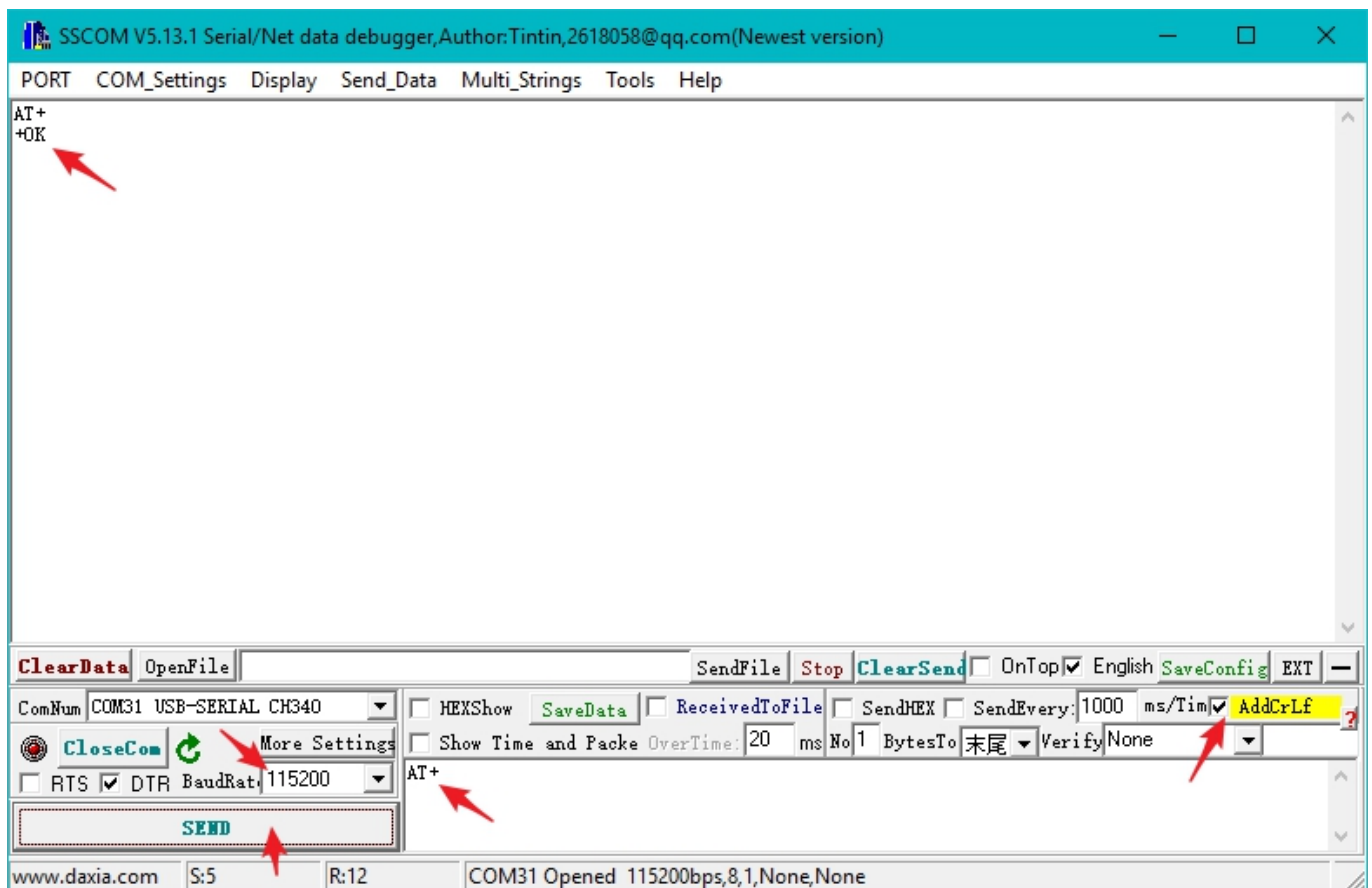
Getting Started

To use the **W600 Module**, you need to use [USB-to-Serial Tools](#) to connect the RX/TX pins to your computer, also you need to power this module with the **3.3v** and **GND** pins.

!!!Note For mac, we found that some version of mac system can not recognize the on-board USB-to-Serial chip CH330N, please check here for solution [Mac os driver issue](#)

We use the serial port tool **sscom** to send the AT command. You can use your favorite serial port tool, in case you want to use **sscom**, you can download it [Here](#).

What ever, please make sure you have checked the option **AddCrLf**, and set the baud rate to **115200**



Tap **AT+** then click **SEND** or press ++enter++ key to to check if the connection was successfully established.

```
AT+
```

When it returns **+OK**, you can use the AT command to control this module.

Create a SoftAP process

- 1- **WPRT** sets the wireless network card working mode to SoftAP:

```
AT+WPRT=2
```

- 2- **APSSID** Set the AP SSID for the STA, e.g.*MyAP*:

```
AT+APSSID=MyAp
```

- 3- **APENCRY** Set the wireless network card security mode to WEP64:

```
AT+APENCRY=1
```

Parameter:

open: 0, WEP64: 1, WEP128: 2

- 4- **APKEY** Set the wireless network card key to *12345*

```
AT+APKEY=1,1,12345
```

Parameter 1: Key format, 0 means HEX, 1 means ASCII

Parameter 2: index: Key index number, 1 to 4 are used for WEP encryption keys, and other encryption methods are fixed to 0.

Parameter 3: wireless key, e.g.: 12345

- 5- **APNIP** Set the ip address and subnet mask

```
AT+APNIP=1,192.168.1.1,255.255.255.0,192.168.1.1,192.168.1.1
```

Parameter 1: address type: 0 means dynamic allocation using DHCP, 1 means static address

parameter 2: ip:192.168.1.1

parameter 3: netmask: 255.255.255.0

parameter 4: gateway: 192.168.1.1

parameter 5: dns: 192.168.1.1

- 6- **PMTF** saves the above parameters to spi flash, just start from step 7 with the next boot.

```
AT+PMTF
```

- 7- **WJOIN** Create wireless network *MyAp*

```
AT+WJOIN
```

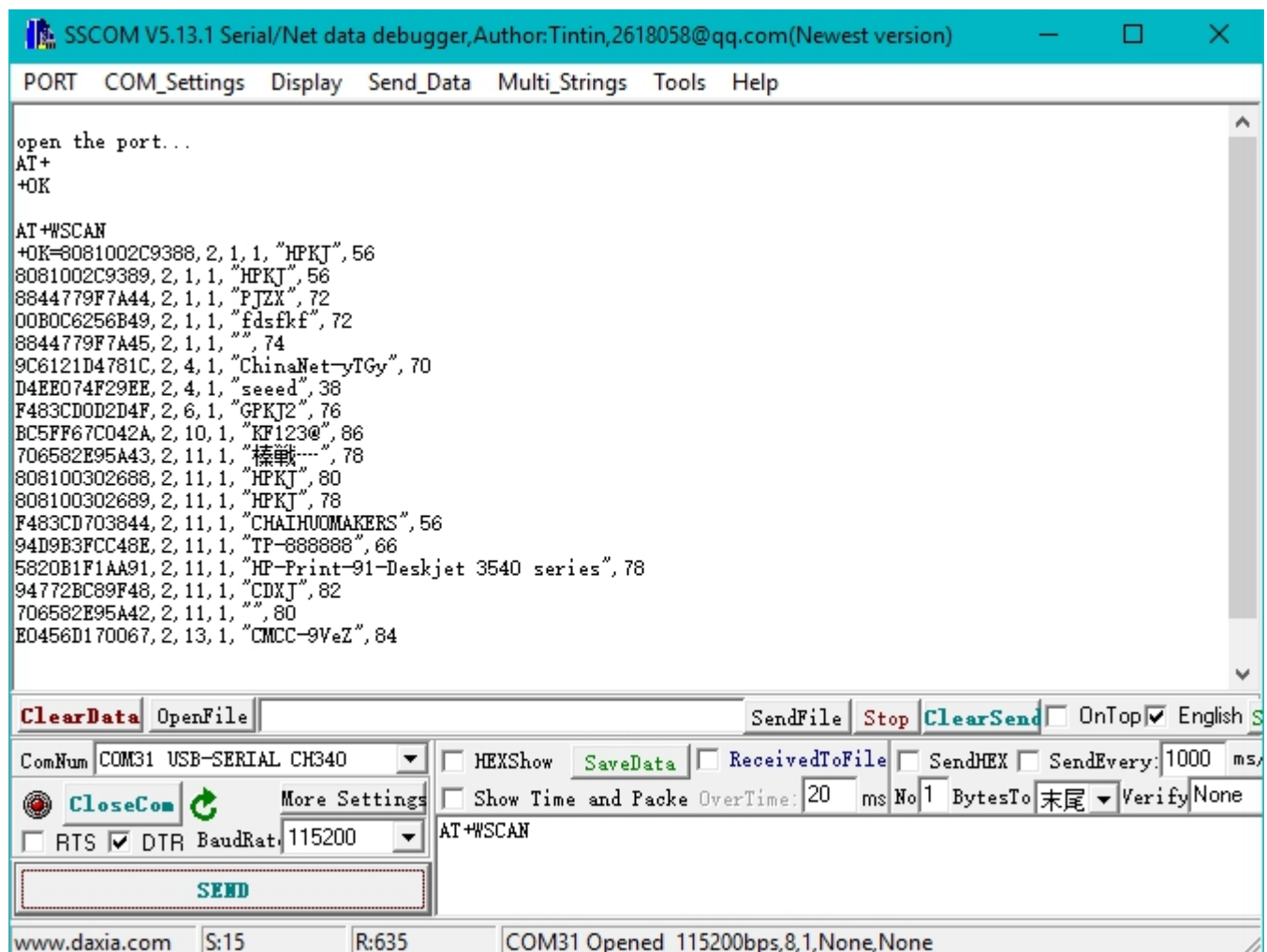

- 8- **SLIST** Query the STA information which connected to your SoftAP.

AT+SLIST

Scan AP Process

Wireless network card scanning AP's AT command is :

AT+WSCAN



The last parameter is the signal strength, unit db

STA joins the AP process

- 1- **WPRT** Set the working mode to STA

AT+WPRT=0

- 2- **SSID** Set the AP name to join. e.g. *TEST_AP*

```
AT+SSID=TEST_AP
```

- 3- **KEY** Set the wireless key of the AP you want to join. e.g. 12345678

```
AT+KEY=1,0,12345678
```

parameter 1: 0 means HEX, 1 means ASCII

parameter 2: index: The key index number, 1 to 4 is used for the WEP encryption key. The other encryption methods are fixed to 0.

parameter 3: Wireless key e.g.: 12345678

- 4- **NIP** Enable DHCP

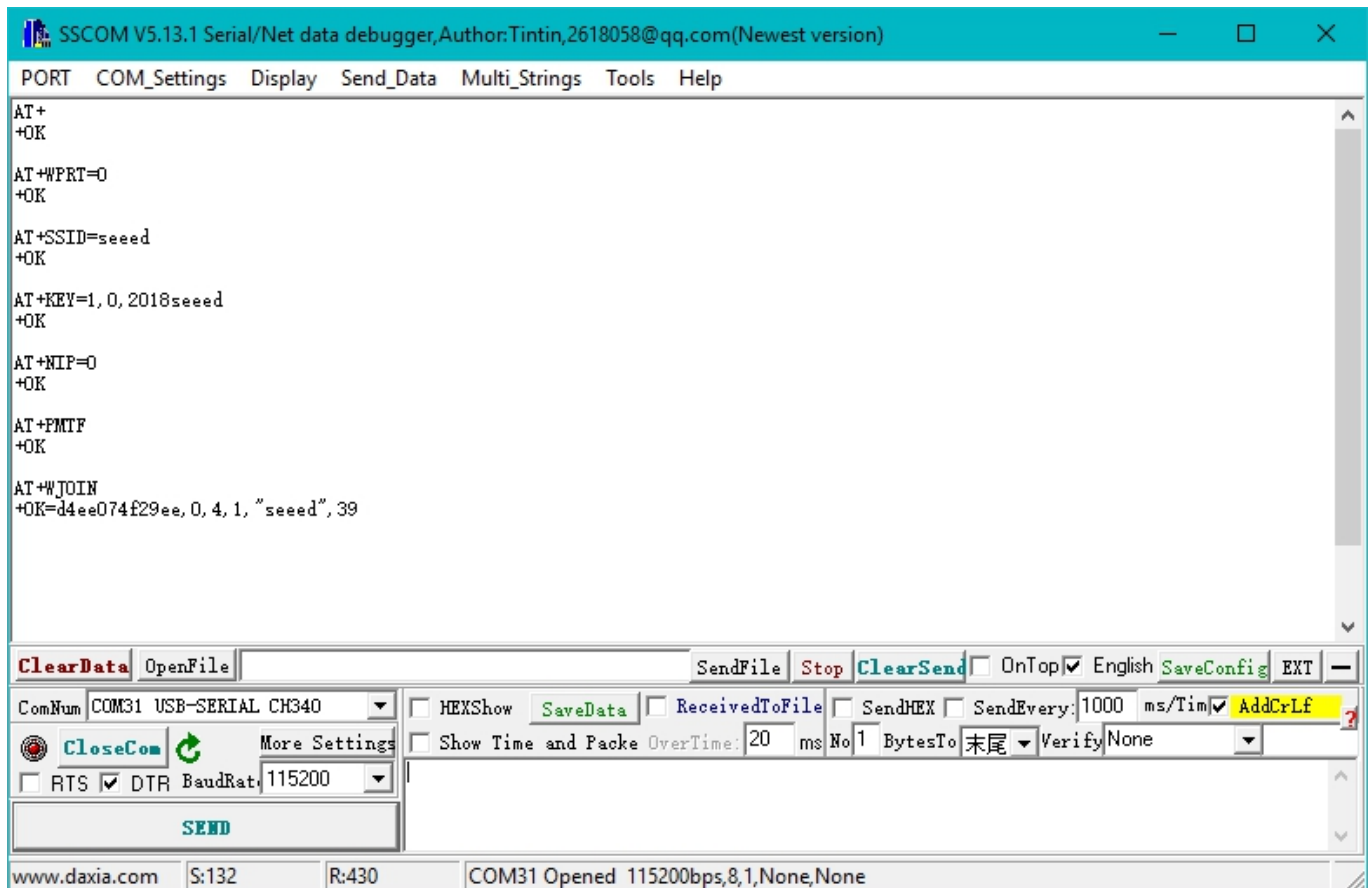
```
AT+NIP=0
```

- 5- **PMTF** Save the above parameters to spi flash, Just start from step 6 with the next boot

```
AT+PMTF
```

- 6- **WJOIN** Join the wireless network TEST_AP

```
AT+WJOIN
```



Create an APSTA process

- 1- **WPRT** Set the working mode to APSTA

```
AT+WPRT=3
```

- 2- **SSID** Set the AP name to be joined, such as *TEST_AP*

```
AT+SSID=TEST_AP
```

- 3- **KEY** Set the wireless key of the AP you want to join. e.g. *12345678*

```
AT+KEY=1,0,12345678
```

parameter 1: 0 means HEX, 1 means ASCII

parameter 2: index: The key index number, 1 to 4 is used for the WEP encryption key. The other encryption methods are fixed to 0.

parameter 3: Wireless key e.g.: 12345678

- 4- **APSSID** Set the network name of the created SOFTAP

```
AT+APSSID="MYSoftAP"
```

- 5- **APENCRY** Set the encryption type of SoftAP (such as WPA2-TKIP)

```
AT+APENCRY=5
```

- 6- **APKEY** Set the password for SoftAP (e.g. ASCII code 87654321)

```
AT+APKEY=1,0,87654321
```

- 7- **APNIP** Set the IP address and subnet mask

```
AT+APNIP=1,192.168.1.1,255.255.255.0,192.168.1.1,192.168.1.1
```

- 8- **PMTF** Save the above parameters to spi flash, just start from step 9

```
AT+PMTF
```

- 9- **WJOIN** Join the wireless network TEST_AP

```
AT+WJOIN
```

!!!Note For more detail about AT command, please check the [WM_W60X_SDK_AT Command_V1.0.2.pdf](#)

Firmware Programming

For the firmware programming please check here:

[WM_W60X_SDK_User Manual_V1.0.0.pdf](#) and [WM_W60X_Firmware Generation Guide_V1.1.pdf](#)

FAQ

Q1.How the STA disconnects the AP

A: The wireless network card disconnects the AP's AT command:

```
AT+WLEAV
```

Q2.SoftAP disconnected

A: The AT command of SoftAP disconnected network is:

```
AT+WLEAV=2
```

Q3.How STA view current status

A: The AT command for the wireless network card to view the status of the current network card is:

```
AT+LKSTT
```

Q4. How to View current SoftAP status

A: The AT command to view the current SoftAP status is:

```
AT+APLKSTT
```

Resource

- **[PDF]** [WM_W60X_SDK_AT Command_V1.0.2.pdf](#)
- **[PDF]** [W600 HardwareDesignGuide_v1.0.1.pdf](#)
- **[PDF]** [W60X_SDK_User Manual_V1.0.0.pdf](#)
- **[PDF]** [WM_W60X_Firmware Generation Guide_V1.1.pdf](#)
- **[ZIP]** [W600 Module schematic files](#)
- **[ZIP]** [sscom](#)

INTEGRATION INSTRUCTIONS

1.0

This modular transmitter complies with FCC Rules Part 15C.

1.1 Specific operational use conditions Antenna Change Notice to Host manufacturer

Recommend using antenna which certified with this module mentioned in this manual. If you desire to increase antenna gain and either change antenna type or use same antenna type certified, a Class II permissive change application is required to be filed by us, or you (host manufacturer) can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application, based on the new emissions testing. Please perform testing on frequency bands where the antenna gain is highest, worst-case band-edges based on original filing, and only on frequency bands where the antenna gain is highest.

1.2 RF exposure compliance instruction

This module is limited to installation in mobile application with a minimum separation distance of at least 20 cm from a person's body, a separate approval is required for all other operating configurations, including portable configurations with respect to §2.1093 and different antenna configurations. Host product manufacturer shall at least provide information of minimum separation distance to end users in RF exposure compliance statement to end users in their end-product manuals.

1.3 This module is tested with the following antenna

Antenna Type	Brand/ manufacturer	Model No.	Max. Antenna Gain
PCB	Seedstudio	113990614	0.88dB

1.4 Labelling and compliance statement instruction for host product manufacturer

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains FCC ID: Z4T-W600MODULE" any similar wording that expresses the same meaning may be used.

§ 15.19 Labelling requirements shall be complied on end user device. Labelling rules for special device, please refer to §2.925, § 15.19 (a)(5) and relevant KDB publications. For E-label, please refer to §2.935.

1.5 Guide on test modes and additional testing requirements

Host product manufacturer is ultimately responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, additional transmitter(s) in the host, etc.).

Furthermore, FCC KDB 996369 D04 Module Integration Guide v01 has elaborated guidance for modular transmitter integration for host product manufacturers.

Test software access to different test modes:

RF Test Software: NCAUTH_V1.1.05

RF Test Mode: RF out at 802.11b/g/n20/n40, RF receive at 802.11b/g/n20/n40, AP model, Station model

1.6 Disclaimer on additional testing, Part 15 Subpart B compliance of Host Product


This modular transmitter is only FCC authorized for the specific rule parts listed on our grant, host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification.

Host manufacturer in any case shall ensure host product which is installed and operating with the module is in compliant with Part 15B requirements.

Please note that For a Class B or Class A digital device or peripheral, the instructions furnished the user manual of the end-user product shall include statement set out in §15.105 Information to the user or such similar statement and place it in a prominent location in the text of host product manual. Original texts from FCC Rules are as following you may refer to:

For Class B

Note




This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

For Class A

Note



This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC regulatory compliance statement

§15.19 Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

§15.21 Information to user

Warning: changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

RF Exposure compliance statement

This module complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.