# RINO

#### Wi-Fi module (XY3721-B3C) specifications

#### **User's Guide**

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保密, 未经犀云书面允许, 不可传播

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## Product Overview

XY3721-B3C is a low-power embedded Wi-Fi module developed by Shenzhen Xiyun Technology Co., LTD. It is equipped with

Bluetooth 5.2 and Wi-Fi 802.11nA chips, which can run independently or as a slave in other MCUS.

When the module is equipped with external applications and is the only application processor in the device, it can be booted directly from the built-in Flash; also

Contains low power consumption, maximum main frequency 160MHz, built-in 288KB RAM, 2Mbyte flash and rich peripheral resources.

XY3721-B3 WiFi module supports IEEE 802.11b /g/n protocol standard, BLE5.2, and lightweight TCP/IP

Protocol stack, and support STA, AP, AP+STA mode. Users can use this module to add networking power to existing devices

Can, or can build a separate network controller.

To provide customers with a complete hardware, software reference scheme, in order to shorten your product development cycle, for you to save cost investment.

#### 1.1 Features

- > Supports the 802.11b /g/n/BLE5.2 standard protocol
- > Built-in lightweight TCP/IP protocol stack
- Built-in TR switch, Balun, LNA, PA, and integrated onboard antenna (compatible with external antenna)
- ▶ MCU up to 160M clock frequency +288KB RAM
- ▶ Built-in 2Mbit Flash
- Supports remote firmware OTA upgrade, which can be started by the mobile APP, AT command
- ➢ Support STAAPAP+STA working mode
- > Support WEP/TKIP/WPA/WPA2 security protocol
- > Support 802.11e and WMM/WMM PS protocol
- > Support Smart Link intelligent networking function
- ➢ Support HT20
- ➢ Supports 6-way hardware PWM
- ≻ Max output power of +16dBm in Wi-Fi 802.11b mode
- Bluetooth Max output power +6dBm
- > Voltage range 2.7V<sup>3</sup>.6VDC, 3.3V 500mA single power supply is recommended
- > Onboard antenna, compatible with external antennas

#### 1.2 Main application areas

- Smart lighting
- Smart home
- Smart Sensing
- Smart Office
- Smart Gateway
- Smart indus



#### 2.1 Dimensional Package

The XY3721-B3C Wi-Fi module has 3 rows of pins, a total of 22, and the pin spacing is 2mm. XY3721-B3Wi-Fi module size: 16

 $\pm$ 0.35mm (W)  $\times$ 24 $\pm$ 0.35mm (L)  $\times$ 3.0 $\pm$ 0.15mm(H), where the PCB thickness is 0.8mm $\pm$  0.1mm, the package is shown in Figure 2.1:



Top view Bottom view



Bottom attempt

#### 2.2 Pin definition

Pin Serial Number	Symbol	IO type	Features	
1	RST	1	Hardware reset pin (active low), corresponding to the CEN of the IC	
2	ADC	I/O	ADC port, which can be reused as ordinary IO, corresponding to the P28 of the IC	
3	EN	1	Module enable pin, internal pull up processing, compatible with other module design docking	
4	P16	Ι/Ο	Common I/O port, corresponding to P16 of the IC	
5	P26	I/O	Ordinary IO port, can do LED driver PWM output, corresponding to IC P26, PWM5	
6	P24	1/0	Ordinary IO port, can do LED driver PWM output, corresponding to IC P24,PWM4	
7	P6	I/O	Ordinary IO port, can do LED drive PWM	
			output, corresponding to IC P6,PWM0	
8	VCC	Р	Module power supply pin (typical value 3.3V)	
9	GND	р	Power reference place	
10	P9	1/0	Ordinary IO port, can do LED driver PWM output, corresponding to IC P9,PWM3	
11	TX2	1/0	Common I/O port, configured as UART_TXD2 debug output by default, corresponding to P0 of the IC	
12	CSN	I/O	Common I/O port, corresponding to P21 of the IC	
13	P8	1/0	Ordinary IO port, can do LED drive PWM output, corresponding to IC P8, PWM2	
14	Ρ7	I/O	Ordinary IO port, can do LED driver PWM output, corresponding to IC P7,PWM1	
15	RXD	1/0	Serial port receiving pin UART_RXD1, which can be reused as a common I/O port, corresponding to P10 of the IC	

16	TXD	1/0	Serial port receiving pin UART_TXD1, which can be reused as a common I/O port, corresponding to P11 of the IC
17	P15	I/O	Normal IO port
18	P14	I/O	Normal IO port
19	P22	I/O	Normal IO port
20	P20	I/O	Normal I/O port -
21	RX2	1/0	Common I/O port. The default value is UART_RXD2, which corresponds to P1 of the IC
22	P17	I/O	Normal IO port

Description: VCC stands for power pin, I/O stands for input/output pin, ADC stands for analog input

## **B** Electrical parameters

Parameters	Numerical values		
Operating frequency	2.4GHz ISM band		
Wireless standards	Wi-Fi 802.11n + BLE 5.2		
Antenna type	Board PCB antenna or IPX antenna interface		
Storage temperature	-55℃ ~ +125℃		
Supply voltage	From 2.7 V to 3.6 V		
Electrostatic release voltage (mannequin)	TAMB-25℃ 4KV		
Electrostatic release voltage (machine model)	TAMB-25 ° C 0.2KV		
Operating voltage	3.3 V		
Operating temperature	-40°C ~ +85℃		

#### 3 RF output powe

Parameters	Minimum	Typical	Maximum	Units
	value	value	value	
Working frequency Wi-Fi	2412		2462	MHz
Operating frequency BLE	2402		2480	MHz
Input impedance		50		Ω

#### 3.1 RX receiving sensitivity

Parameters	Minimum	Typical	Maximum	Units
	value	value	value	
Sensitivity (802.11b@11Mbps,CCK)		- 88.		dBm
Sensitivity (802.11g@54Mbps,OFDM)		- 75.		dBm
Sensitivity (802.11n@HT20,MCS7)		- 72.		dBm
Sensitivity (BLE@1M)		- 92.		dBm

#### 3.2 Transmit power

Parameters	Minimum	Typical	Maximum	Units
	value	value	value	
Power output (802.11b@11Mbps)			17.19	dBm
BLE output power (802.11g@54Mbps)			16.89	dBm
Output power (802.11n@HT20,MCS7)			15.42	dBm
Output power (BLE@1M)			3.37	dBm

#### 3.3 Power consumption

The following power consumption data are measured data under 3.3V power supply

Working state	Mode	Rate	Launch work Rate/recepti on	Average	Peaks (typical values)	Units
send	802.11 b	11Mbps	16dBm	81	270	mA
Launch	802.11 g	54Mbps	15dBm	82	260	mA
Launch	802.11 n	MCS7	14dBm	85	253	mA
Receivi ng	802.11 b	11Mbps	Continuo us reception	73	73	mA
Receivi ng	802.11 g	54Mbps	Continuo us reception	75	75	mA
Receivi ng	802.11 n	MCS7	Continuo us reception	75	75	mA

## 4 Antenna Information

#### 4.1 Antenna Types

The XY3721-B3C Bluetooth module uses an onboard PCB antenna or IPX antenna interface

#### 4.2 Reduce antenna interference

To ensure optimal RF performance, it is recommended to keep the distance between the antenna part of the module and other metal parts at least 15mm. If using the environment

The antenna is surrounded by metal materials, which greatly attenuates the wireless signal and deteriorates the RF performance. Since the module is installed as a plug-in,

Be careful to leave enough space for the antenna area.











Top view:



Note: The default module external dimension tolerance is  $\pm$  0.35mm, the key dimension tolerance is  $\pm 0.1\text{mm}$ 

The circular pad in the left center of the module is the RF test point of the module, and this part of the pad is not shown in the package library.



Please apply the SMT patch according to the reflow graph, the peak temperature is 245°C, and the reflow temperature curve is shown in the figure below: Refer to

IPC/JEDEC standard; Peak Temperature:<250 ° C; Number of Times: <2 times



7

## Appendix: Schematic diagram



#### Module MOQ with packaging information

Product Model	MOQ (PCS)	Shipping	Quantity of	Number of
number		packing method	shipping	packaging rolls
			packaging	per box
XY3721-B3C	3600	Carry tape reels	900	4

#### 8 List of applicable FCC rules FCC Part 15 Subpart C 15.247 & 15.209

Specific operational use conditions.

The module can be used for mobile applications with a maximum 2.54dBi antenna. The homanufacturer installing this module into their product must ensure that the final compos it product complies with the FCC raquirements by a technical asessment or evaluation to the FCC rules , including the transmitter operation . The host manufacturer has to be aware not toprovide information to the end user regarding how to install or remove this RF module in the users manual of the end product which integrates this module . The end user manual shallinclude all required regulatory information / waming as show in this manual.

Limited module procedures. Not applicable.

The module is a Single module and complies with the requirement of FCC part 15.212.

Trace antenna designs .Not applicable .

The module as its ow antenna, and doesn't need a host sprinted boardmicrostrip trace antenna etc

RF exposure considerations.

The module must be installed in the host equipment such that at least 20cm is maintained between the antenna and users " body, and if RF exposure statement or module layout is changed, then the host product manufacturer required to take responsibility of the modulethrough a change in FCC ID or new application. The FCC ID of the module cannot be used on the final product In these circumstance, the host manufacturer willbe responsible forevaluating the end product ( including the transmier ) and obtaining a separate FCC authorization

Antennas: Antenna Specification are as follows :

Type : PCB Antenna Gain : 2.54dBi Max

This device is intended only for host manufacturers under the following conditions: The module shall be only used with the internal antennas ) that has been originally tested andcertified with this module . The antenna must be either permanently attached or employ aunique antenna coupler .As long as the conditions above are met , further transmitter test will not be required However , the host manufacturer is still responsible for testing their end-product for anyadditional compliance requirements required with his module installed for example , digitaldevice emissions , PC peripheral requirements , etc : )

Label and compliance information

Host product manufacturers need to provide a physical or e-label stating " Contains FCC ID:2A9TO-XY3721-B3C with their finished product.

Infomation on the modes and additional testing requirements

Host manacor ms pa orm s of aiad & oced mission and spuriousemission a in ac test modes for a stand - alon modular transmiter inhost , as well as for multi silanus ramming modules or other transmitters in a host product. Only when all the test results of test modes comply with FCC requirements , then the end product can be sold legally.

Additional testing, Part 15 subpart B disclaimerThe modular transmitter is only FCC authorized for FCC Part 15 Subpart c 15.247 & 15. 209 and that the host product manufacturer is responsible for compliance to any otherFCC rules that apply to the host not covered by the modular transmitter grant of cerification.

If the grantee markets their product as being art 15 Subpart B compliant when it alsocontains unintentional-radiator digital circuity, then the grantee shall provide a notice statingthat the final host product still requires art 15 Subpart B compliance testing

CAUTION: Any changes or modifications not expressly approved could void the user's authority to operate the equipment.

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

Note: This equipment has been tested and found to comply with the limits .pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protectionagainst harmful interference in a residential installation. This equipment generates, uses, and canradiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful in terference 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.

This equipment 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 & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.