Shenzhen Xinwu Technology XW32-BLE Transparent Transmission Module User Manual

Contents

SHENZHEN

Shenzhen Xinwu Technology XW32-BLE Transparent Transmission

Version History, Disclaimer, and Notice

Version History

Version	Date	Author	Description
V1.0	2019/03/26	Chen	First draft
V1.1	2019/09/11	Chen	Update Description

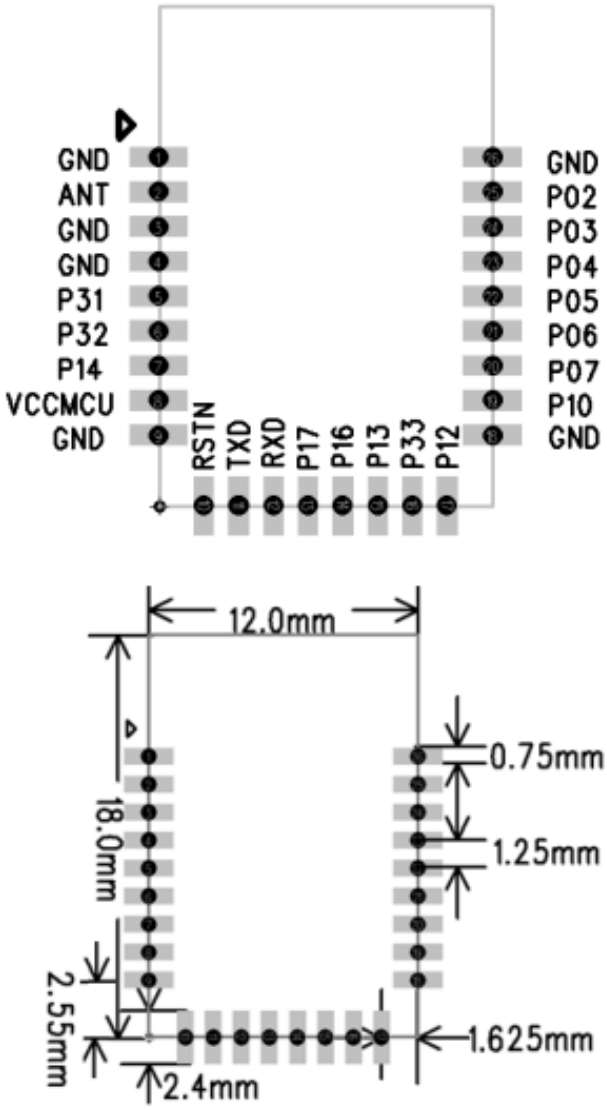
Disclaimer and Notice

The document is provided “AS IS”, without warranty of any kind, including the implied warranties of merchantability and applies to any guarantee for a particular purpose, or non-infringement, and any proposal, specification or sample of any guarantee mentioned anywhere else. This document does not bear any responsibility, including the use of the document information from infringement of any patent infringement liability. This document is not here by estoppel or otherwise, any intellectual property rights is granted the license, whether express or implied license. The information in this document might be modified for upgrades or other reasons. XINWU corporation reserves the right to make changes without notice. This document is used for the design guide only, XINWU corporation try its best to supply the correct information, but it does not assure there is not any error in this document. All the ostensive or implied states, information, and suggestion are not guaranteed.

General Description

Module XW32-BLE is a highly integrated Bluetooth 4.2 dual-mode with 2 Mbps data rate option. It integrates a high-performance RF transceiver, baseband, ARM9E core, rich feature peripheral units, programmable protocol and profiles to support BLE application. The Flash program memory makes it suitable for customized applications.

Package and Dimensions



Length mm	Width mm	Height mm	PAD bottom mm	Pin pitch mm
18	12	1.7±0.2	0.75 x 2.4	1.25

Pin Assignment

No.	Pin name	Description
1 3 4 9 18 26	GND	GND
2	ANT	External antenna available when required
5	P31	IO interface ADC1
6	P32	IO interface ADC2
7	P14	IO interface PWM4
8	VCCBAT	3.0V VCC
10	RSS	Reset, low effective(controlled by external MCU IO)
11	P00/TXD1	IO interface or UART1 RDX for UART sending
12	P01/RXD1	IO interface UART1 RDX for UART reception
13	P17	IO interface UART_RXD2
14	P16	IO interface UART_TXD2
15	P13	IO interface PWM3
16	P33	IO interface ADC3
17	P12	IO interface PWM2
19	P10	IO interface PWM0
20	P07	IO interface PWM5 SPI_NSS JTAG_TMS
21	P06	IO interface SPI_MISO PWM4 JTAG_TCK
22	P05	IO interface SPI_MOSI JTAG_TDO
23	P04	IO interface SPI_SCK JTAG_TDI
24	P03	IO interface I2C_SDA , JTAG_NTRST
25	P02	IO interface I2C_SCL

Product Function and Test Description

BLE slave mode support.

- Default setting:
  - Operation Mode: transparent transmission mode default. For using the AT
  - command please switch to the command mode;
  - UART parameter: 9600, 8 bit data, no parity bit , 1 bit for stop;
  - BLE name: BleSerialPort;

    - Broadcast interval: “80, 80”, max=50ms, min=50ms;
    - Connect interval: “36,24,2,100”, max=36, min=24, latency=2,
    - timeout=300(max=45ms,min=30ms,latency=2,timeout=1000ms).
- UART ports could be enabled to switch operation status and sleeping status.
- AT command mode and transparent transmission mode could be switched by using the command.
- AT command for parameter configuration is available.
- At 0dBm Tx power, connecting distance reaches 40m in an open area.
- Each frame can packet up to 20 bytes of data.
- Sleeping current: refer to chapter 10
- Supply voltage: 1.55~3.5V, 3.0 V is recommended
- Dimension: 18mm*12mm*1.7mm
- Applications: BLE health products, Wearable devices, Smart home, BLE toys, Lighting control, Bluetooth to serial products.

UUID

- Slave service UUID: 0xFFB0
- Eigenvalue UUID: 0xFFB1 Properties: Write Notify
- Eigenvalue UUID: 0xFFB2 Properties: Write Notify

Communication Interface for Module and MCU

- **Asynchronous Serial Communication**
  BLE module communicates with MCU by serial port (UART). Default port parameter: baud rate 9600, 8 data, 1 stop, no parity.
- **Packet Format**
  Transparent transmission mode: BLE module forwards the data from MCU to APP without change. And the same as data from APP to MCU. Instruction mode: Module can be configured by AT command by either APP or PC UART.
- **Operation Mode Setting**
  Switching between AT command mode and transparent transmission mode: Power on default transparent transmission mode. Send“+++” then return“AT+ok Mode=AT Mode\r\n”, the module turns into AT command mode and AT command are available for setting and reading. Send“AT+exit\r\n” then return“AT+ok Mode=Normal\r\n”, the module turns back to transparent transmission mode and data will be transparently transmitted directly.

AT Command

Notice: Power on default transparent transmission mode, and send“+++” into command mode. AT command finishes with “\r\n” in command mode. Tick ”send new line” in serial port assistant.

AT Command List

Command	Description
“AT+setBR 9600\r\n”	Set baud rate
“AT+getName\r\n”	Read BLE name
“AT+setName=bleName\r\n”	Set BLE name
“AT+getAddr\r\n”	Get BLE address
“AT+setAddr=112233445566\r\n”	Set BLE address
“AT+getStatus\r\n”	Get BLE status
“AT+setAdvInt 80 100\r\n”	Set broadcast interval
“AT+setConnInt 36 24 2 300 \r\n ”	Set connection interval
“AT+disConnect\r\n”	Disconnect
“AT+reStart\r\n”	Restart
“AT+getPara\r\n”	Get config parameter
“AT+exit\r\n”	Exit command mode(truns to transparent tr ansmission mode); Send “+++”swichs to co mmand mode to transparent transmission mode.
“AT+shutDown\r\n”	Shut down
“AT+reStore\r\n”	Factory reset
“AT+getInfo\r\n”	Version inquiry
“AT+help\r\n”	Instruction help

Set Baud Rate

- Notice: Not valid until manual restart.
- Example: “AT+setBR 9600\r\n” (“\r\n”is end mark, hexadecimal as “0D 0A” , the same below)
- Hex: 41 54 2B 20 73 65 74 42 52 20 39 36 30 30 0D 0A (There is no space between each number. The space can be inserted by some software and some can ignore spaces automatically, the same below) Replies: “AT+ok\r\n” (Operation completed); “AT+err_code\r\n” (Operation failed,refer to“Returned error code indication”for detailed err_code) Baud rate range: (Error indicated for incorrect baud rate) 2400, 4800, 9600, 19200, 38400, 57600, 115200

Read BLE Name

- Example: “AT+getName\r\n”
- Hex: 41 54 2B 20 67 65 74 4E 61 6D 65 0D 0A
- Replies: “AT+ok\r\n” (Operation completed); “AT+err_code\r\n” (Operation failed, refers to“Returned error code indication”for detailed err_code)

Set BLE Device Name

- Notice: Not available until manual restart.
- Example: “AT+setName=bleName\r\n”(such as SENSSUN FAT)
- Hex: 41 54 2B 20 73 65 74 4E 61 6D 65 20 3D 62 6C 65 4E 61 6D 65 0D 0A
- Replies: “AT+ok restart effect!\r\n” (Operation completed, valid after sending

Read BLE MAC Address

- Example: “AT+getAddr\r\n”
- Hex: 41 54 2B 20 67 65 74 41 64 64 72 0D 0A
- Replies: “AT+ok FF:11:22:33:66:FF\r\n” (Operation completed); “AT+err_code\r\n” (Operation failed, refer to“Returned error code indication”for detailed err_code)

Set BLE MAC Address

- Example: “AT+setAddr=112233445566\r\n”
- Hex: 41 54 2B 20 73 65 74 41 64 64 72 3D 31 31 32 32 33 33 34 34 35 35 36 36 0D 0A
- Replies: “AT+ok restart effect!\r\n” (Operation completed, valid after sending command and restart); “AT+err_code\r\n” (Operation failed, refer to“Returned error code indication”for detailed err_code)

Read BLE Status: Broadcast/Connected

- Example: “AT+getStatus\r\n”
- Hex: 41 54 2B 20 67 65 74 53 74 61 74 75 73 0D 0A

00	Idle
01	Broadcasting
02	Connecting
03	Scan with response
04	scan without response

Set Broadcast Interval

Not valid until manual restart. Example: “AT+setAdvInt 80 100\r\n” (min interval 80*0.625ms, max interval 100*0.625ms) Hex: 41 54 2B 20 73 65 74 41 64 76 49 6E 74 20 38 30 20 31 30 30 0D 0A (Maximum and minimum of broadcast interval,“min<=max”, 80~16000 correspond to 50ms~10000ms) Replies: “AT+ok restart effect!\r\n” (Operation completed, valid after sending command and restart); “AT+err_code\r\n” (Operation failed, refer to“Returned error code indication”for detailed err_code)

Set Connection Interval

Notice: valid immediately, constantly setting will get dropped. Example: “AT+setConnInt 36 24 2 300 \r\n ”(The value respectively max, min, latency, timeout) Hex: 41 54 2B 20 73 65 74 43 6F 6E 6E 49 6E 74 20 33 36 20 32 34

20 32 20 33 30 30 0D 0A In the example above, max interval 36*1.25ms, min interval 24*1.25ms, latency 2, connecting timeout 300*10ms. Min and max broadcast interval range: 0x0006~0x0C80(7.5ms~4000ms), min<=max. Latency: value range: 0x0000~0x01F3(0~499). Connecting time out: value range: 0x000A~0x0C80. Connection interval must less than connecting timeout: [max*1.25 * (1+latency)] < 10 * timeout. Replies: “AT+ok\r\n” (Operation completed, valid immediately without restart); “AT+err_code\r\n” (Operation failed, refer to“Returned error code indication”for.

Disconnect BLE

- Example: “AT+disConnect\r\n”
- Hex: 41 54 2B 20 64 69 73 43 6F 6E 6E 65 63 74 0D 0A
- Replies: “AT+ok\r\n” (Operation completed); “AT+err_code\r\n” (Operation failed,
- refer to“Returned error code indication”for detailed err_code)

Reset/Restart

- Example: “AT+reStart\r\n”
- Hex: 41 54 2B 20 72 65 53 74 61 72 74 0D 0A
- Reply: “AT+ok restart now \r\n” (Operation completed, restart at once automatically)

Read Parameter

- Example: “AT+getPara\r\n”
- Hex: 41 54 2B 20 67 65 74 50 61 72 61 0D 0A
- Reply: “AT+ok uart 9600,8,N,1; adv 120 160; con 36,24,2,300.\r\n” (Operation completed), returned parameter contains UART port, broadcast interval, connection interval.

Exit Command Mode

- Example: “AT+exit\r\n”
- Hex: 41 54 2B 20 65 78 69 74 0D 0A
- Reply: “AT+ok Mode=Normal\r\n” (Operation completed, switches to transparent transmission mode)

Shut Down

- Example: “AT+shutDown\r\n”
- Hex: 41 54 2B 20 73 68 75 74 44 6F 77 6E 0D 0A
- Reply: “AT+ok power off now!\r\n”(Operation completed)

Factory reset

- Example:“AT+reStore\r\n”
- Hex: 41 54 2B 20 72 65 53 74 6F 72 65 0D 0A
- Reply:“AT+ ok restart now\r\n”(Operation completed)

Version inquiry

- Example:“AT+getInfo\r\n”
- Hex: 41 54 2B 67 65 74 49 6E 66 6F 0D 0A
- Reply:AT+ok HW=XW32-BLE-BLE-JXKJ,SW=V0.2

Instruction help

- Example: “AT+help\r\n”
- Hex:41 54 2B 20 68 65 6C 70 0D 0A
- Reply:AT+ok Help: system_shutdown

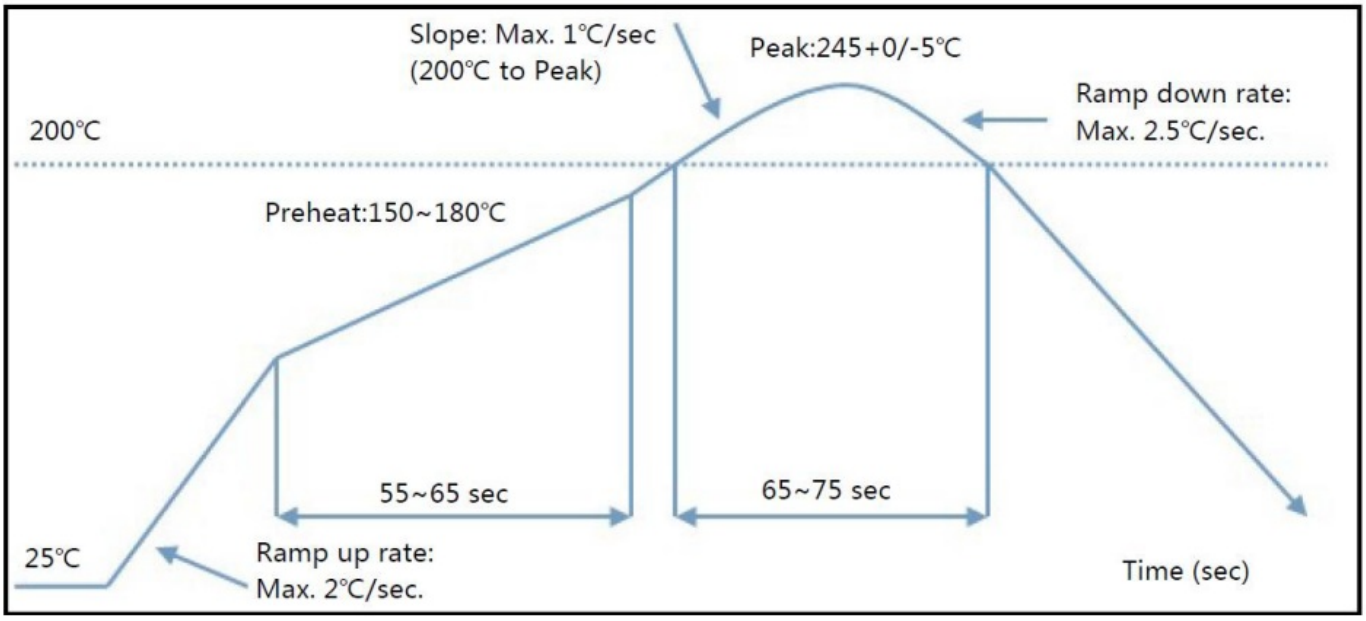
Returned Error Code Indication

err_code	Indication
“06”	The last operation was not completed
“07”	Command parameter is not valid
“08”	Disconnected
“09”	Connecting
“10”	Broadcasting
“11”	Operation failed

Power consumption

- Broadcast interval 100ms 220ua
- Broadcast interval 500ms 70ua
- Broadcast interval 1000ms 40ua
- Deep sleep current(no broadcast) 7uA

Recommended Reflow Profile



FCC

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.

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

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: 2AW97-XW32" any similar wording that expresses the same meaning may be used. 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. The module is limited to OEM installation ONLY. The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install-module. The module is limited to installation in mobile applications. Separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and different antenna configurations. There is a requirement that the grantee provides guidance to the host manufacturer for compliance with Part 15B requirements. The OEM integrator is responsible for ensuring that the end-user has no manual instructions to remove or install the module. The module is limited to installation in mobile or fixed applications. The final host/module combination may also need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device. The FCC Part 15 Statement shall be included in the user manual of the end-user product if applicable. This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Documents / Resources

 BLE4.2 Transparent Transmission Module User manual XW32-BLE	**Shenzhen Xinwu Technology XW32-BLE Transparent Transmission Module** [pdf] User Manual XW32, 2AW97-XW32, 2AW97XW32, XW32-BLE Transparent Transmission Module, XW32-BLE, Transparent Transmission Module