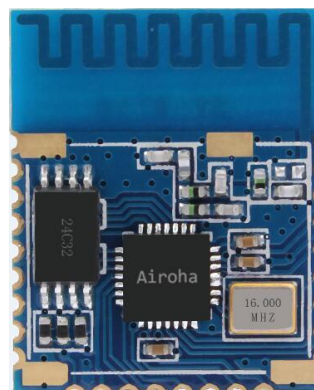


## Table Of Contents

<b>1, Overview .....</b>	
<b>2, Module Default Parameters .....</b>	
<b>3, Application Area.....</b>	
<b>4, Power consumption parameters.....</b>	
<b>5, Radio frequency characteristics.....</b>	
<b>6, Transparent Transmission Parameters .....</b>	
<b>7, Module Pin Description And Minimum Circuit Diagram.....</b>	
<b>8, Pin Function Description .....</b>	
<b>9, Detailed Description Of Function pins.....</b>	
<b>10, Dimensions .....</b>	
<b>11, LAYOUT Precautions.....</b>	
<b>12, AT COMMAND.....</b>	
12.1 Get The Software Version.....	
12.2 Set/Query Device Name.....	
12.3 Set/Query - Serial Port Baud Rate.....	
12.4 Software restart ... ..	
<b>13, Contact Us .....</b>	

## 1. Overview

The BT16 4.2 Bluetooth transparent transmission module adopts the latest Bluetooth 4.2 BLE single chip AB1602 from Airoha, and realizes GATT-based Bluetooth data transmission through the embedded data transparent transmission service. BT16 4.2 Bluetooth transparent transmission module supports serial command mode, which is used to realize the interaction between external MCU and module. The user can perform parameter configuration and some control on the module through serial port commands, such as modifying the UUID, modifying the Bluetooth name, and controlling the Bluetooth disconnection..



## 2. Module default parameters:

<b>Bluetooth Protocol</b>	Bluetooth Specification V4.0 BLE
<b>Working Frequency</b>	2.4GHz ISM band
<b>Communication Interface</b>	UART
<b>Power Supply</b>	3.3V
<b>Communication distance</b>	10-15M (Open and unobstructed environment)
<b>Physical Dimension</b>	18 (L)mm x 14.5(W)mm x 2(H) mm
<b>Bluetooth Authentication</b>	BQB FCC CE ROHS REACH
<b>Bluetooth Name</b>	BT16
<b>Serial Port Parameters</b>	9600、8 data bits、1 stop bit、No check、No flow control
<b>Maximum single packet number of bytes</b>	280 Bytes
<b>Service UUID</b>	FFE0
<b>Notify\Write UUID</b>	FFE1
<b>Write UUID</b>	FFE2
<b>Storage temperature</b>	MIN:-55℃ - MAX:+125℃
<b>Work temperature</b>	MIN:-20℃ - MAX:+70℃
<b>Customized requirements</b>	<a href="#">If you have other special function requirements, you can contact us to customize the module.</a>

### 3. Application area:

DX-BT16 module supports BT4 .2 BLE protocol, which can be directly connected to iOS devices that have BLE Bluetooth function, and supports background program resident operation.

Successful application of BT16 module:

- ※ Bluetooth wireless data transmission;
- ※ Mobile phones, computer peripherals;
- ※ Handheld POS device;
- ※ Medical equipment wireless data transmission;
- ※ Smart Home Control;
- ※ Automotive Inspection OBD Equipment;
- ※ Bluetooth printer;
- ※ Bluetooth remote control toy;
- ※ Anti-lost device, LED light control;

### 4. Power consumption parameters:

Mode	Status	Current	Unit
Low power mode	Discoverable	200	uA
	Connected	1	mA
Normal working mode	Discoverable	4	mA
	Connected	4	mA

### 5. Radio frequency characteristics:

Rating	Value	Unit
BLE Transmit power	0	dBm
BLE Sensitivity	-93	dBm

### 6. Transparent transmission parameters

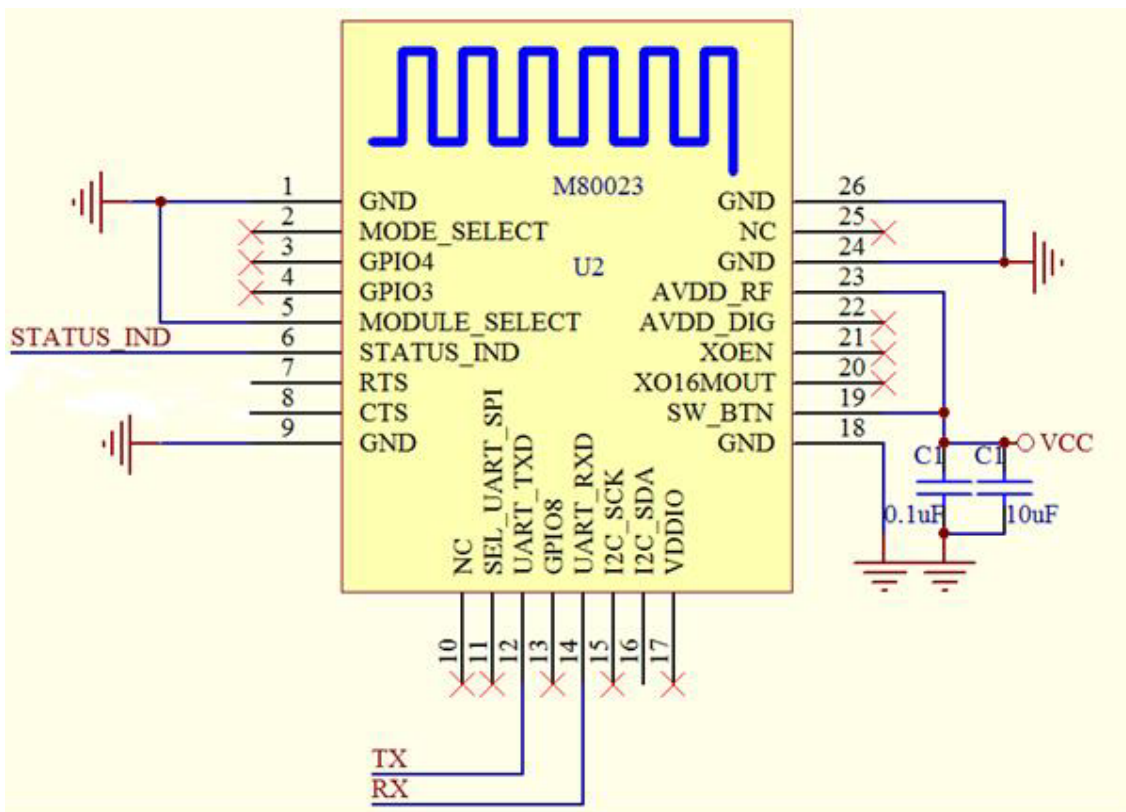
#### Data throughput:

Android ->BT16 -> UART		UART ->BT16 -> Android	
Baud rate	115200	Baud rate	115200
Connection interval (ms)	30	Connection interval (ms)	20
Serial packet size (bytes)	100	Serial packet size (bytes)	200

Transmission interval (ms)	50	Transmission interval (ms)	70
Throughput (bytes/s)	1916	Throughput (bytes/s)	2800
Characteristic Write	Write without Response	Characteristic Notify	Notify
iPhone 6 ->BT16 -> UART		UART ->BT16 -> iPhone 6	
Baud rate	115200	Baud rate	115200
Connection interval (ms)	18.75	Connection interval (ms)	18.75
Serial packet size (bytes)	100	Serial packet size (bytes)	255
Transmission interval (ms)	100	Transmission interval (ms)	100
Throughput (bytes/s)	1000	Throughput (bytes/s)	2550
Characteristic Write	Write without Response	Characteristic Notify	Notify

Note: This table parameter is for reference only and does not represent the maximum data throughput that the module can support.

## 7. Module pin description and minimum circuit diagram:



## 8. Pin function description:

Pin number	Pin name	Pin description
1	GND	GND
2	NC	NC
3	GPIO4	Reserved
4	GPIO3	Reserved
5	MODULE_SELECT	Working mode : input low level; Low power mode: input high level; (Note: When the module enters the low power mode, the data cannot be sent out, but the mobile phone data can still be received and sent to the MCU through the serial port)
6	STATUS_IND	Bluetooth connection status indication: High level - Bluetooth is connected Low level - Bluetooth is not connected
7	RTS	SCL
8	CTS	SDA
9	GND	GND
10	NC	NC
11	SEL_UART_SPI	NC
12	UART_TXD	UART_TXD
13	STATUS_IND	Bluetooth connection indicator (not connected low, connection high)
14	UART_RXD	UART_RXD
15	I2C_SCK	Reserved
16	I2C_SDA	Reserved
17	VDDIO	Module GPIO power supply pin, voltage range: 1.8~3.3V. The high level voltage of GPIO is determined by this pin voltage
18	GND	GND
19	SW_BTN	High level – boot Low level – shutdown (Note: When using the module, this pin is pulled high, and when it is pulled low, it is turned off)
20	XO16MOUT	16M clock output
21	XOEN	XO16MOUT output enable control, active high or floating
22	AVDD_DIG	NC

23	AVDD_RF	VCC voltage range: 1.4~3.6V (default 3.3V)
24	GND	GND
25	NC	NC
26	GND	GND

## 9. Detailed description of function pins:

1、 P19 PIN (SW\_BTN): module switch pin

Pin state	Module status
Input low level	Shut down
Input high level	Power on

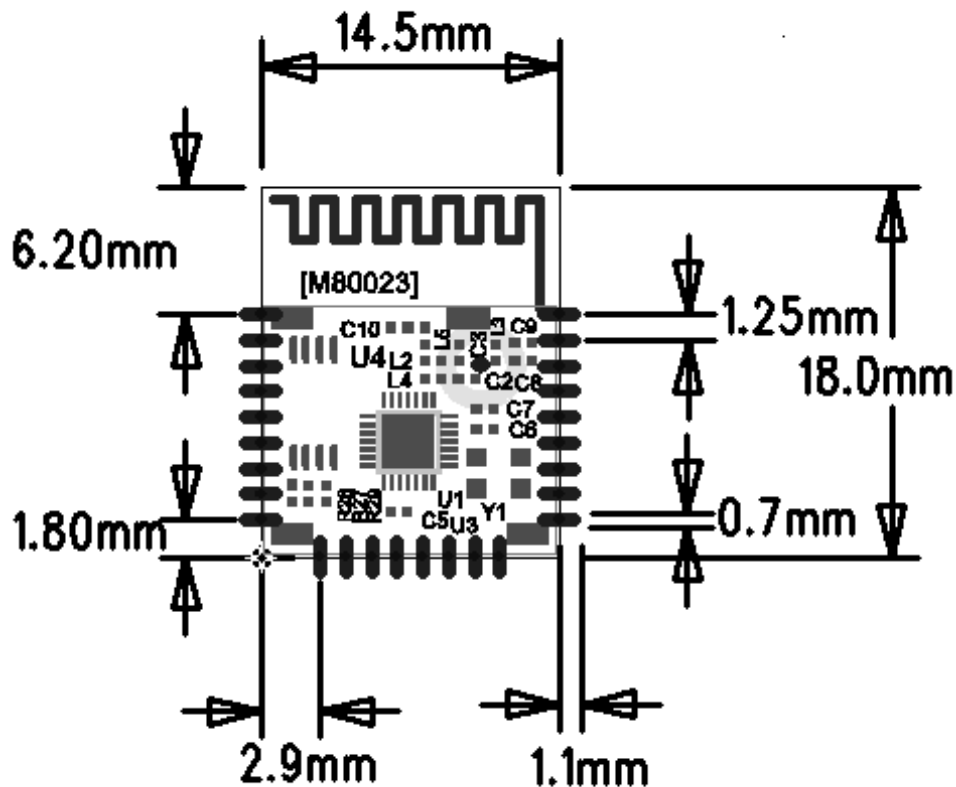
2、 P6 PIN (STATUS\_IND): connection status indicator pin

Pin state	Module status
Input low level	standby mode
Input high level	Connection Status

3、 P5 PIN (MODULE\_SELECT): mode selection pin

Pin state	Module status
Input low level	working mode
Input high level	Low power mode

## 10. Dimensions:



## 11. LAYOUT Precautions:

The DX-BT16 Bluetooth module works in the 2.4G wireless band. It should try to avoid the influence of various factors on the wireless transceiver. Pay attention to the following points:

1. the product shell surrounding the Bluetooth module to avoid the use of metal, when using part of the metal shell, should try to make the module antenna part away from the metal part.

2. The internal metal connecting wires or metal screws of the product should be far away from the antenna part of the module.

3. The antenna part of the module should be placed around the PCB of the carrier board. It is not allowed to be placed in the board, and the carrier board under the antenna is slotted. The direction parallel to the antenna is not allowed to be copper or traced. It is also a good choice to directly expose the antenna part out of the carrier board.

4. It is recommended to use insulating material for isolation at the module mounting position on the substrate. For example, put a block of screen printing (TopOverLay) at this position.

## 12. AT COMMAND

### (Note: AT command mode when the module is not connected)

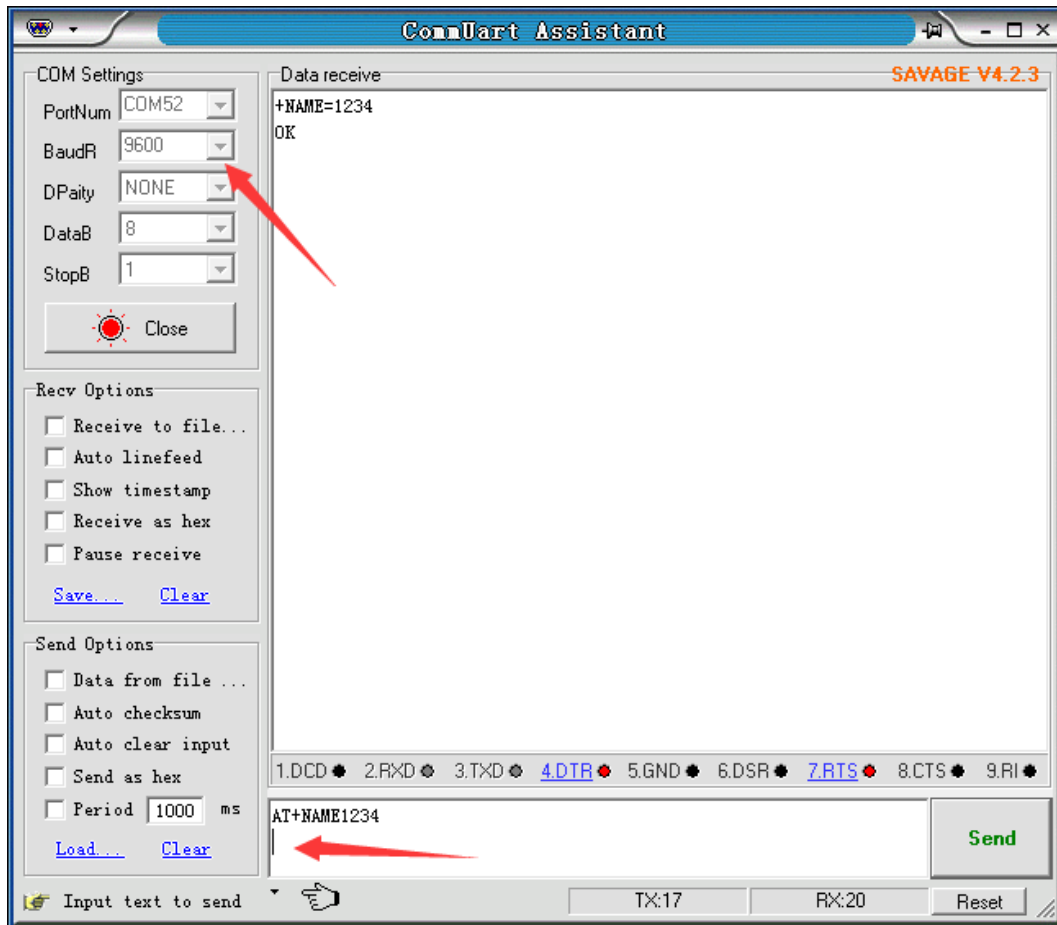
1. AT command, which belongs to the character line instruction, is parsed according to the line (that is, AT command must be returned by carriage return or `\r\n`, hexadecimal number is 0D0A)

2. The AT command supports case and the instruction prefix is AT+, which can be divided into parameter setting instructions and read instructions.

3. Set the instruction format: AT+<CMD><PARAM> Operation returns successfully: +<CMD>=<PARAM>\r\n OK\r\n Failure does not return characters.

4. Read instruction format: AT+<CMD>Operation succeeds: +<CMD>=<PARAM>\r\n Failure does not return a return character.

**AT command format example (Figure is to change the Bluetooth name to 1234):**



### 1、 Get The Software Version:

Function	Command	Response	Description
Query version number	AT+VERSION\r\n	+VERSION=<version>\r\n OK\r\n	<version > Software version number

Note: The version will be different depending on different modules and customization requirements.

### 2、 Set/Query Device Name:

Function	Command	Response	Description
Query module Bluetooth name	AT+NAME\r\n	+NAME=<name>\r\n	<name> Bluetooth name, up to 18 bytes
Set the module Bluetooth name	AT+NAME<name>\r\n	+NAME=<name>\r\n OK	Default name: BT16



**Example:**

1. Send Settings:

AT+NAME=DX-BT16\r\n ---Set module device name: "DX-BT16"

return:

+NAME=DX-BT16\r\n ---Set module device name: "DX-BT16" succeeded

OK\r\n

2. Send inquiry:

AT+NAME\r\n ---Query module name

return:

+NAME=DX-BT16\r\n ---Return module device name: " BT16"

**3、Set/Query - Serial Port Baud Rate:**

Function	Command	Response	Description
Query module baud	AT+BAUD?\r\n	+BAUD=<baud>\r\n	<baud> Baud rate
Set the module baud	AT+BAUD=<baud>\r\n	+BAUD=<baud>\r\n OK\r\n	corresponding serial number  1:9600 2:19200 3:38400 4:57600 5:115200 Default: 0 (9600)

**Note:** The module must be re-powered after setting the baud rate, enabling the new baud rate for data communication and AT command resolution.

**Example:** Setting the Serial Port Baud Rate: 38400

1. Send Settings:

AT+BAUD2\r\n

return:

+BAUD=2\r\n

OK\r\n

2. Send inquiry:

AT+BAUD\r\n

return:

+BAUD=2\r\n

OK\r\n

#### 4、 Software restart:

Function	Command	Response	Description
Software restart	AT+RESET\r\n	OK\r\n	

### 13. Contact us

#### Shen Zhen DX-SMART Technology Co., Ltd.

**Address:** 511 ,Building C, Yuxing Technology Park, Yuxing Chuanggu, Bao'an District, Shenzhen,  
China

**Tel:** 0755-2997 8125

**Fax:** 0755-2997 8369

**Website:** <http://www.szdx-smart.com/>