



**Shenzhen Hi-Link Electronic CO.,Ltd**

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## **HLK-B40**

Master-slave integrated Bluetooth  
transparent transmission module  
Specifications



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# 1 Product Introduction

HLK-B40 is a BLE5.1 master-slave integrated Bluetooth-serial transparent transmission module developed and produced by Hilink Electronics. All kinds of devices with serial ports can use this module to send and receive data simply and quickly using Bluetooth wirelessly.

This product can be set as a Bluetooth slave device or a host device to use, and the slave supports simultaneous connection by multiple hosts.

Using the serial port-Bluetooth two-way transparent transmission function of this module, users do not need to understand the complicated Bluetooth protocol stack, just connect the client's device or MCU serial port to this module, and the module will automatically complete the communication between the serial port and Bluetooth (GATT) Two-way data forwarding is equivalent to a bridge between the user's MCU serial port and the Bluetooth device, enabling the user's serial device to add Bluetooth wireless transmission function.

Support AT command mode, you can query or set the basic parameters of the module through the serial AT command, such as device name, serial port baud rate, etc.

This module provides a wealth of test tools and documentation, including mobile APP Demo, which is convenient for users to quickly get familiar with and apply this module. The module has a wealth of on-chip resources and external pins, and can provide flexible and in-depth software and hardware custom development services for the specific needs of customers.

The schematic diagram of the Bluetooth-serial port transparent transmission function is as follows:



Figure 1 Schematic diagram of one-to-one Bluetooth connection transparent transmission function

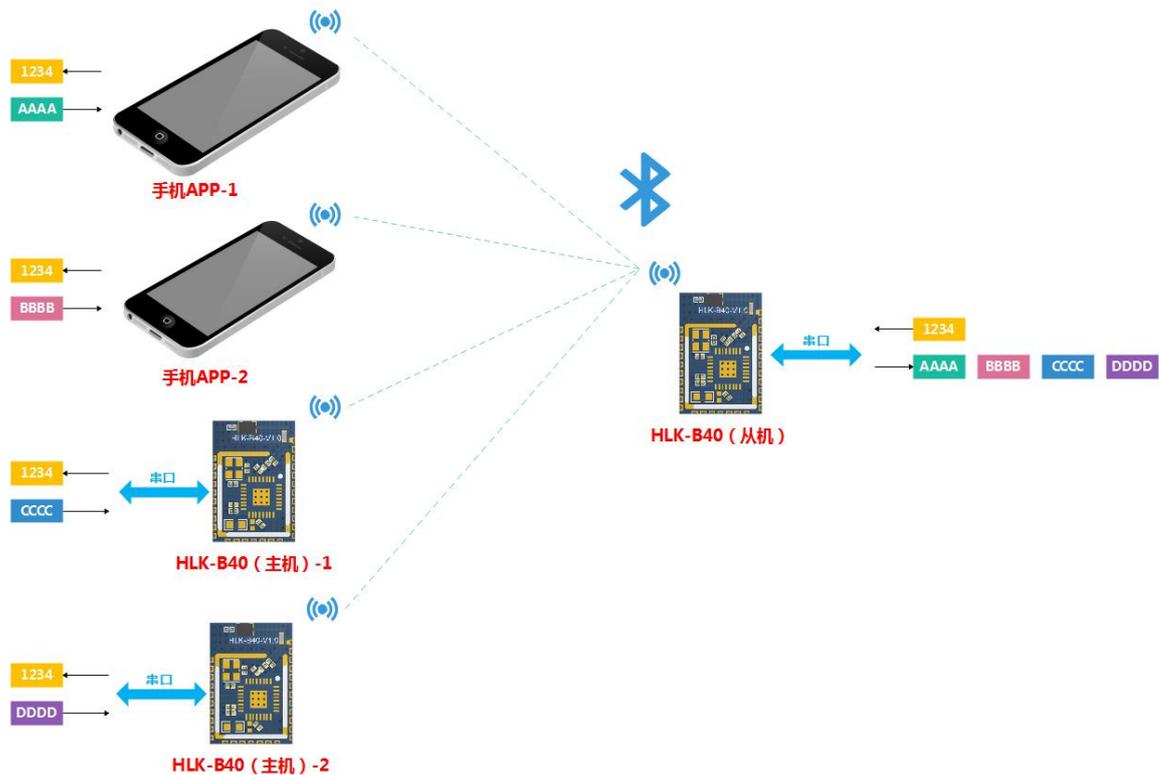


Figure 2 Schematic diagram of many-to-one Bluetooth connection transparent transmission function

## 2 Features

- Main frequency 48MHz, 32-bit ARM Cortex M3 core
- Fast and stable Bluetooth-serial port transparent transmission, serial port baud rate can reach 921600
- Master-slave integrated Bluetooth, can be set to master or slave mode, support binding encryption
- Up to 20 host devices can be connected at the same time in Bluetooth slave mode, and support custom broadcast data
- Based on BLE5.1, faster speed, longer transmission distance, up to 40-100m in open environment
- Support low power consumption mode, sleep current as low as 6 $\mu$ A, support custom connection and broadcast interval
- The Bluetooth transmit power is adjustable, up to 10dBm, and the receiving sensitivity can reach -95dBm

- Support OTA Bluetooth wireless upgrade module firmware, wireless configuration module parameters
- The default onboard high-quality ceramic antenna increases the transmission distance, and an external antenna can also be used
- Built-in Watchdog, reliable for long-term operation
- Mini Size, 14mm×9.5mm×2mm
- Wide working voltage 1.8~4.2V, typical value 3.3V
- Rich output pins (UART, I2C, SPI, up to 15 GPIO, up to 4 ADCs, up to 6 PWMs), which can provide flexible and in-depth software and hardware custom development services

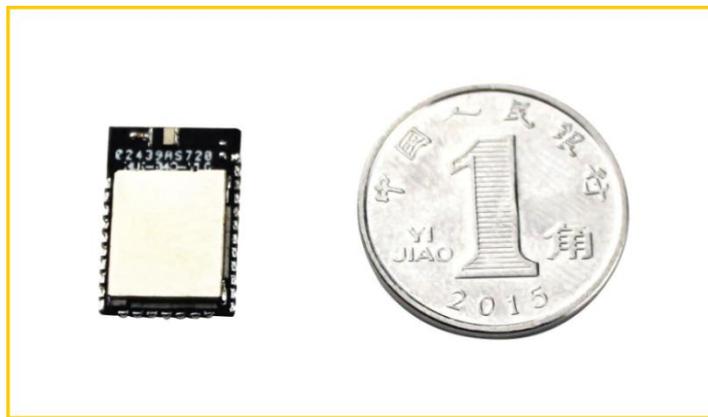


Figure 3 Module physical size comparison chart

### 3 Application scenario

The serial port-Bluetooth two-way transparent transmission provided by HLK-B40 provides a simple and flexible data channel, which can be widely used in various products that need to transmit data wirelessly via Bluetooth.

Examples of commonly used application scenarios are as follows:

- **Smart home/home appliances**  
Control smart sockets, smart lights, smart door locks, etc. via mobile phones
- **IOT**  
**Mobile phone and device, wireless data transmission between device and device**
- **Instrumentation**  
**Read data, configure parameters, etc. wirelessly via Bluetooth**
- **Industrial and Agricultural Control**  
Connect various control or sensing devices wirelessly via Bluetooth for reading and control, etc.

- **Medical and health**  
Health data monitoring, wireless nursing equipment, etc.
- **Automotive Electronics**  
**Wireless detection and control, etc.**
- **Toy entertainment**  
**Bluetooth remote control, wireless control and transmission**

## 4 Size/Package

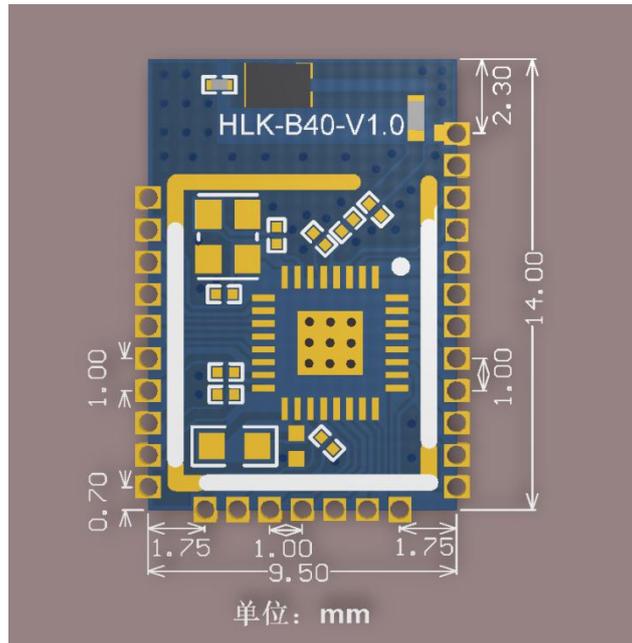


Figure 4 Outline and size diagram

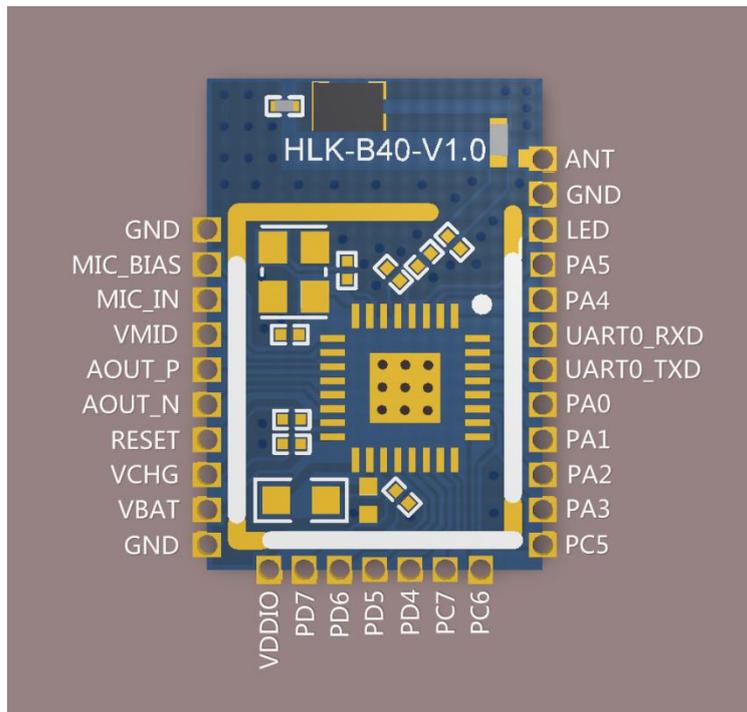


Figure 5 Schematic diagram of pin location

## 5 Pin Definition

Pin	Sign	IO Type	Function
1	GND	GND	Power ground
2	MIC_BIAS	-	Reserved function
3	MIC_IN	-	Reserved function
4	VMID	-	Reserved function
5	AOUT_P	-	Reserved function
6	AOUT_N	-	Reserved function
7	RESET	I	Reset and restart the module, high level is effective, can not be left floating, and an external 10K pull-down resistor is required
8	VCHG	PWR	Charger input, use is prohibited when not using battery power supply
9	VBAT	PWR	Power input DC3.3V, connect to battery under battery power supply
10	GND	GND	Power ground
11	VDDIO	-	Reserved function
12	PD7	-	Reserved function
13	PD6	-	Reserved function
14	PD5	-	Reserved function
15	PD4	-	Reserved function
16	PC7	O	Module sleep state output, high level: full speed work, low level: sleep
17	PC6	I	Module sleep control input.High level: enter sleep, low level: exit sleep, float to high level
18	PC5	I	Function key input, low level is effective, floating is high level
19	PA3	-	Reserved function
20	PA2	-	Reserved function
21	PA1	-	Reserved function
22	PA0	-	Reserved function
23	UART0_TXD	O	Module serial output
24	UART0_RXD	I	Module serial input
25	PA4	O	Bluetooth connection status output, high level: not connected, low level: connected
26	PA5	O	Current working mode output, high level: master, low level: slave

Pin	Sign	IO Type	Function
27	LED	-	Reserved function
28	GND	GND	Power ground
29	ANT		External antenna output

Table 1 Pin definition table

## 6 Typical application circuit

The following is the basic application circuit reference of this module.

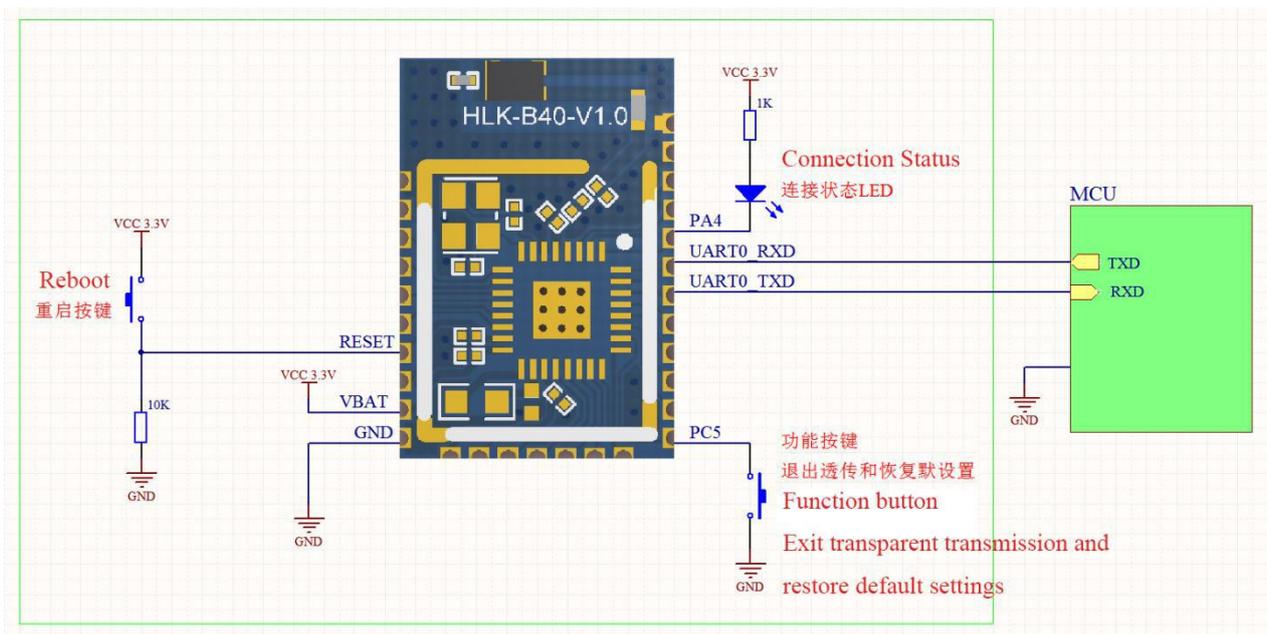


Figure 6 Basic minimum circuit (disable low-power sleep function)

The enabling and disabling of the low-power sleep function of the module can be set by AT commands, and it is disabled by default.

If the low-power sleep function is enabled, the module is controlled by the level of the sleep control input pin, enters sleep or exits sleep according to the input level, and the module will output the current sleep state through the sleep state output pin.

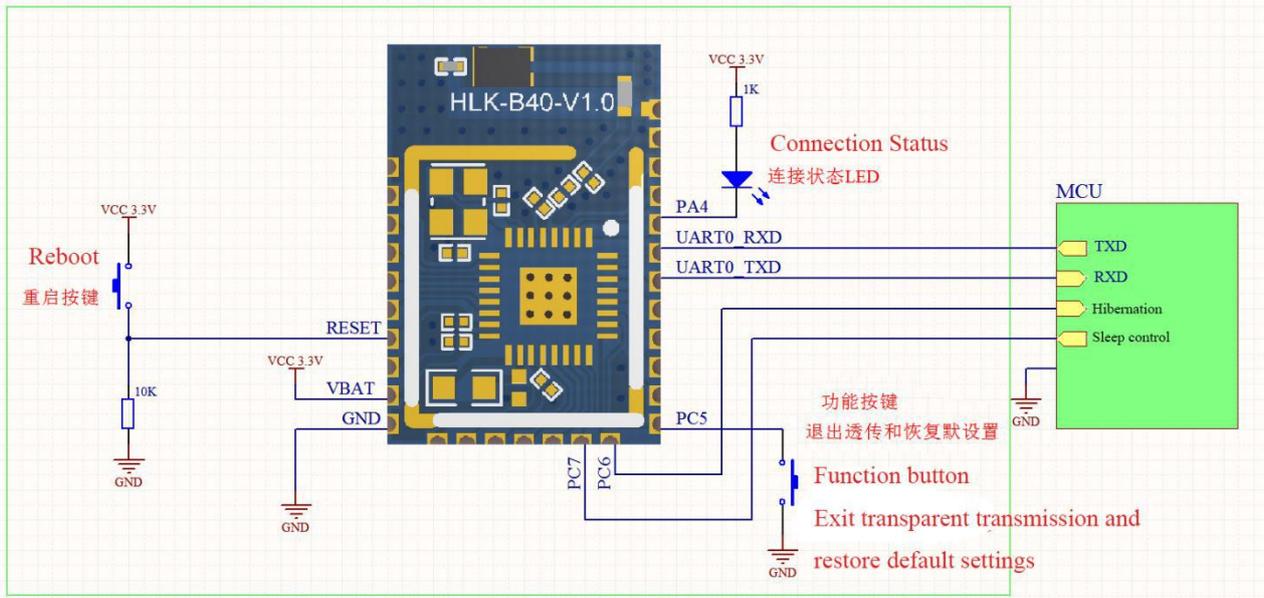


Figure 7 Basic minimum circuit (Enable low-power sleep function)

Noted:

- 1.The RESET pin cannot be left floating, and a 10K pull-down resistor is required.
- 2.Blocking by metal objects will affect the Bluetooth signal transmission and reception. When using, keep the module away from metal objects as much as possible. The PCB design requires the module's  
The bottom of the antenna part is hollowed out and copper cannot be laid.

## 7 Performance and electrical parameters

<b>Power supply and power consumption</b>	Power input requirements	DC 1.8~4.2V, Typical value 3.3V, Power supply capacity>80mA
	IO Output	Voltage 2.9 ~ 3.3V, Maximum output current 8mA
	Power consumption (in a single state)	Bluetooth TX Current (0dB): 8mA Bluetooth RX Current : 9.7mA Sleep average current: 6.1μA
	Average working current (adjustable)	The average operating current is determined by the set transmit power, connection interval and broadcast interval, which can be adjusted. The reference values under the default settings are as follows: Enable hibernation: 50 ~ 80μA Disable hibernation: 4 ~ 5mA Lower power consumption can be achieved by setting the corresponding parameters
	VCHG Charger input voltage	DC 4.8~5.2V, Typical value 5V
<b>Serial parameters</b>	Baud rate	1200,2400,4800,9600,14400,19200,38400,57600,115200,230400,460800,921600

	Data bit	8
	Stop bit	1
<b>Bluetooth parameters</b>	frequency	2402 ~ 2480MHz
	Transmit power	-20 ~ 10dBm can adjust
	Receiving sensitivity	-95dBm
	Standard Specification	Bluetooth V5.1 (LE Mode) L2CAP, ATT, GAP, GATT, HID
	Maximum number of connections	20
	Broadcast interval	50 ~ 2000ms
	Connection interval	7.5 ~ 4000ms
	Custom broadcast data	Support up to 20 bytes of custom broadcast data
	Bind encryption	Support PASSKEY ENTRY mode pairing, 6-digit pincode
	<b>working environment</b>	Operating temperature
<b>Size package</b>	Dimensions	14mm×9.5mm×2mm

Table 2 Performance and electrical parameter table

The following is the measured data of the working current of this module under the default settings, for reference only, the working current will be different under different settings and working scenarios, you can adjust the settings according to the specific application scenarios to make a balance between power consumption and performance;

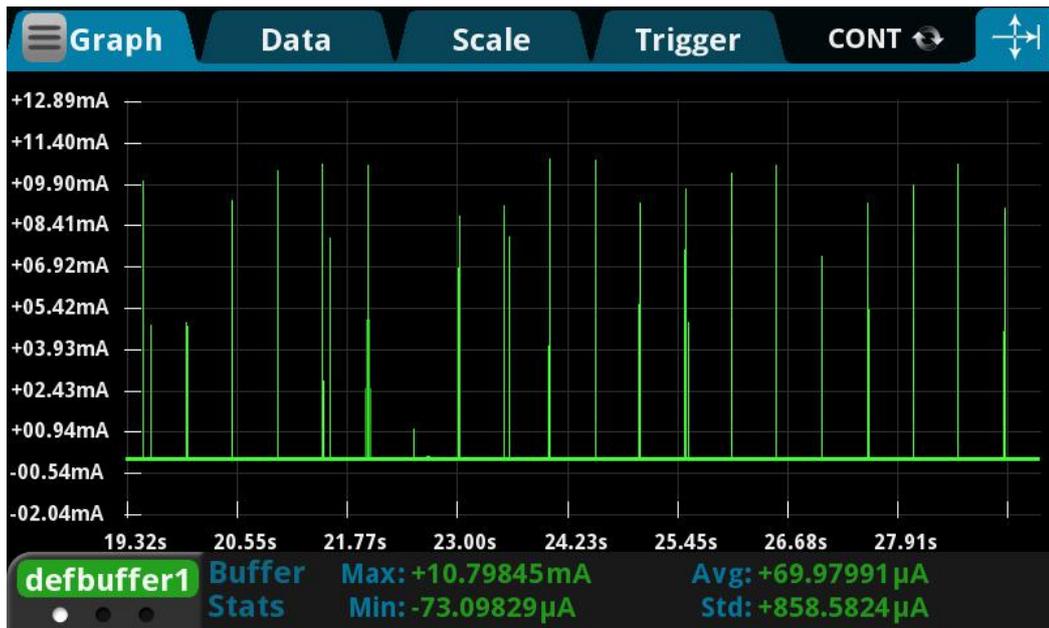


Figure 8 Working current graph when low-power sleep mode is enabled

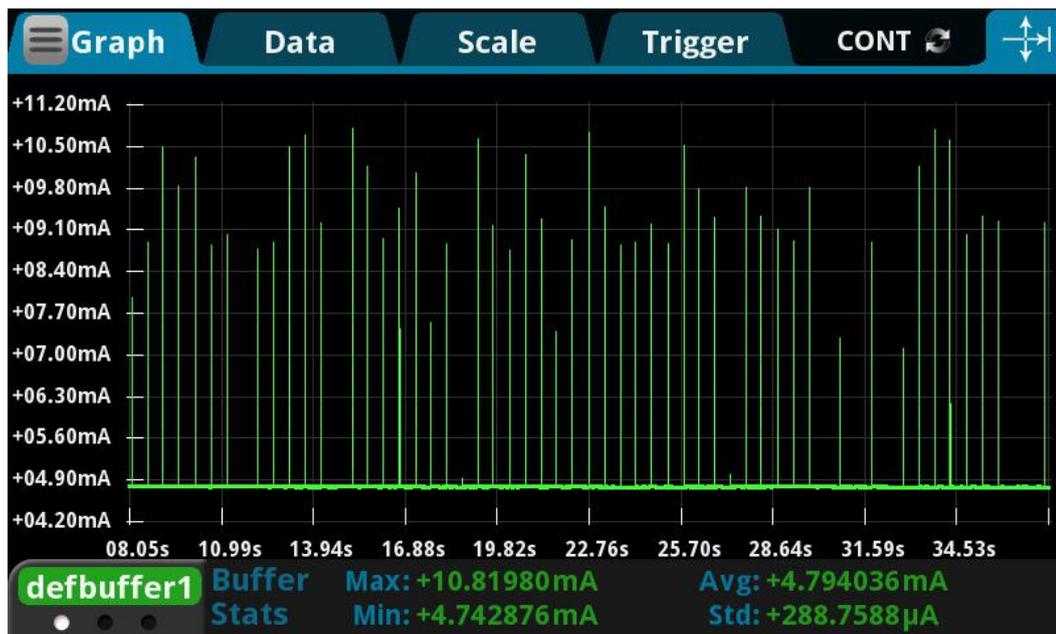


Figure 9 Diagram of working current when low-power sleep mode is disabled

## 8 Revision record

Date	Version	Modify content
2020-10-12	1.0	Initial version
2020-10-31	1.1	Support BLE5.1

## 9 Contact Info



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