

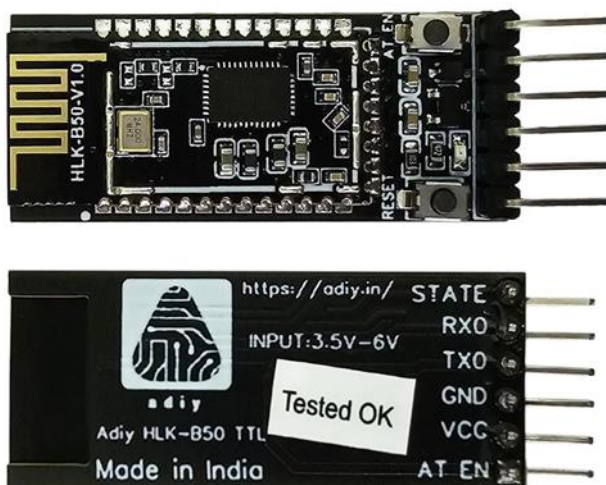


ADIY HLK-B50 TTL MODULE

Dual-Mode Bluetooth 5.0 TTL Module

BLE 5.0 / Classic SPP • Serial Transparent Transmission

Datasheet & AT Command Reference



Firmware Version V1.17 Build 26052010)

www.adiy.in



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1. Introduction

The **ADIY HLK-B50 TTL MODULE** is a high-performance, dual-mode Bluetooth (BLE 5.0 and Classic SPP) serial-port transparent-transmission module. It is built around a 32-bit ARM Cortex-M3 core running at up to 48 MHz and is designed to bridge a user's serial device to a Bluetooth network with minimal firmware effort. The module supports simultaneous SPP and GATT transparent transmission, allowing embedded devices to exchange data wirelessly with high stability and throughput.

Firmware version **V1.17 (Build 26052010)** adds enhanced AT-command compatibility. In addition to the native HLK-B50 command set, the module accepts many of the commonly used AT commands from the **HC-05** and **BT986** modules, which simplifies migration and improves software reuse for existing designs. While most frequently used commands are supported, full command compatibility is not guaranteed — always refer to the AT Command Reference (Section 8) for the authoritative list of supported commands.

At a glance: BLE 5.0 + Classic SPP • ARM Cortex-M3 @ 48 MHz • UART up to 921600 bps • master/slave dual-mode • A2DP/AVRCP audio • built-in watchdog.

2. Key Features

Core architecture	Built-in 32-bit ARM Cortex-M3 core, main frequency up to 48 MHz.
Bluetooth standard	Master/slave dual-mode Bluetooth BLE 5.0 with binding (pairing) encryption support.
Supported protocols	Simultaneous GATT and SPP transparent transmission; A2DP v1.3 and AVRCP v1.6 with built-in audio CODEC.
Serial interface	Fast, stable UART transparent transmission with baud rates up to 921600 bps.
Power management	Wide module operating voltage 2.6–4.2 V (3.3 V typical).
Reliability	Built-in watchdog timer for long-term reliable operation.
Rich peripherals	UART <i>The ADIY HLK-B50 TTL MODULE TTL MODULE only supports UART (TX & RX) for communication</i>

3. Technical Specifications

The table below summarizes the key electrical and functional parameters. Values are as specified by the module vendor; verify against the latest firmware before production.

Parameter	Specification
Processor core	32-bit ARM Cortex-M3, up to 48 MHz
Bluetooth version	Dual-mode: BLE 5.0 + Bluetooth Classic (SPP)
Data transmission	GATT + SPP simultaneous transparent transmission
Audio profiles	A2DP v1.3, AVRCP v1.6 (built-in audio CODEC)
Roles	Master / Slave, switchable (default: Slave)
UART baud rate	4800 – 921600 bps (default 115200)
Module operating voltage	2.6 – 4.2 V (3.3 V typical)
Board supply input	3.5 – 6 V (breakout-board input; on-board regulator)



Parameter	Specification
Peripheral interfaces	UART.
Antenna	On-board PCB antenna
Reliability	Hardware watchdog timer
Default mode	Pass-through (transparent) mode on power-up

Note: The 2.6–4.2 V figure is the core module voltage. The ADIY breakout board carries an on-board regulator and accepts 3.5–6 V on the VCC pin, as marked on the board.

4. Pin Definition

The full pin-out of the HLK-B50 module is shown below. For most applications, only the six-pin user breakout (Section 10) is required.

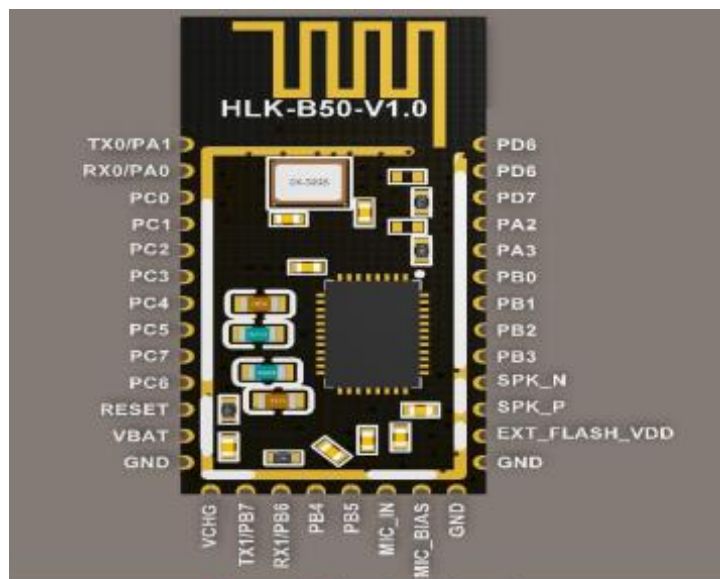


Figure 1 Pin location schematic

Figure 1 — HLK-B50 pin location schematic

5. Operating Modes

The HLK-B50 has two operating states: **Pass-through Mode** and **AT Command Mode**. On power-up the module always starts in Pass-through Mode.

Pass-through (Transparent) Mode

In Pass-through Mode the module transfers data bidirectionally between the serial port and the Bluetooth connection — whatever is received on the UART is sent over Bluetooth, and vice versa.

AT Command Mode

In AT Command Mode you send AT commands over the serial port to query and configure the module's parameters. Serial-to-Bluetooth data transfer is temporarily suspended while in this mode; the Bluetooth connection itself is not dropped. Data transfer resumes automatically when the module returns to Pass-through Mode.

Switching between modes



- Pass-through → AT: while in Pass-through Mode, pull **Pin 9 (PC7 / AT-EN)** low briefly (0.5–3 seconds) to switch to AT Command Mode or press the **AT EN** button of the module for 1-2 seconds
- AT → Pass-through: send **AT+TS=1** to exit AT Command Mode and resume Pass-through Mode. Or simply press **RST** button

6. Bluetooth BLE & Classic Roles & Connectivity

The two devices in a Bluetooth BLE & Classic connection have fixed, complementary roles: a host (master / central) and a slave (peripheral). The role defines each device's responsibilities.

- **Host (Master / Central)**: takes the lead — it scans for slave advertisements, discovers the target device, and initiates and maintains the connection to a selected slave (identified by MAC address or Bluetooth name).
- **Slave (Peripheral)**: broadcasts its own information (such as the device name), then passively waits for and accepts a connection request from a host.

The default role of the B50 is **slave**, which can be changed with the **AT+ROLE** command. Once two BLE devices are connected, they can exchange data in both directions.

7. GATT Service & Characteristic UUIDs

The default values are listed below (service UUID **0000fff0-0000-1000-8000-00805f9b34fb**).

Characteristic UUID	Operation permissions	Function
0000fff1-0000-1000-8000-00805f9b34fb	Read / Notify	Module sends, app receives
0000fff2-0000-1000-8000-00805f9b34fb	Write Without Response	App sends, module receives

Table 1 — Bluetooth pass-through service UUID default values



8. AT Command Reference

Commands are grouped by functions. Multiple command spellings on one row are equivalent aliases (native HLK-B50 plus HC-05 / BT986 compatible forms). Query forms generally append “?” or “=?”.

8.1 System & Information

#	Command(s)	Function	Parameter range / Response
1	AT+VERSION? AT+VER	Read the firmware / software version number.	Read only → version, then OK
2	AT+MAC=? AT+ADDR? AT+ADDR	Read the BLE MAC address (all three are equivalent).	Read only → BLE MAC, then OK
3	AT+DEFAULT=1 AT+ORGL AT+RESTORE	Restore factory-default configuration.	Write only → OK
4	AT+RESET AT+REBOOT	Restart the module. This exits AT mode; press the AT-EN button (or pull PC7 low) to re-enter AT mode. Use after configuration changes to apply them.	Write only → OK

8.2 Role & Security

#	Command(s)	Function	Parameter range / Response
5	AT+ROLE=0 AT+ROLE=1 AT+ROLE=?	Set / query the BLE role.	0: Slave (Peripheral) – default 1: Master / Host (Central) → OK
6	AT+ENCRYPT=1 AT+SENM=1 AT+ENCRYPT? AT+SENM? AT+SSP?	Enable / query pairing (binding) encryption — prompts for a PIN during pairing. Applies to both BLE and BT Classic.	0: Disabled 1: Enabled → OK (prompts PIN)
7	AT+PSWD=0000 AT+PIN=0000 AT+PSWD?	Set / query the pairing PIN. Default 0000.	4-digit integer only (no letters) → OK
8	AT+INQ AT+SCAN	Scan for nearby Bluetooth devices. Returns the MAC addresses of nearby BT and BLE devices.	Read only → device list, then OK

8.3 Device Class, Serial & Name

#	Command(s)	Function	Parameter range / Response
9	AT+CLASS=<param> AT+COD=<param> AT+CLASS=?	Set / query the device class (Class of Device).	e.g. 0x200404 = Audio device 0x5A020C = Smartphone → OK
10	AT+BAUD=115200 AT+UART=115200,0,0 AT+UART?	Set / query the UART baud rate. For AT+UART, append “,0,0” (stop bit, parity) after the rate.	4800 / 9600 / 19200 / 38400 / 57600 / 115200 / 230400 / 460800 / 921600 • default 115200



#	Command(s)	Function	Parameter range / Response
11	AT+NAME="ADIY_HLK_B50" AT+NAME=? AT+BTNAME= "HLK_B50_2827_BT"	Set / query the Bluetooth device name. (BLE or BT, both supported)	String → OK

8.4 Connection (Master mode)

#	Command(s)	Function	Parameter range / Response
12	AT+PEERMAC=<mac> AT+BIND=<mac> AT+SPPCONN=<mac>	Connect to a slave module by its MAC address.	Condition: AT+SCANMODE=0 → OK
13	AT+PEERNAME=<name>	Connect to a slave module by its device name.	Condition: AT+SCANMODE=1 → OK
14	AT+SCANMODE=1 or 0 AT+CMODE=1 or 0	Set the method used to connect to a slave module.	0: connect by MAC address 1: connect by module name → OK

8.5 RF, OTA & Advanced

#	Command(s)	Function	Parameter range / Response
15	AT+AUTHPWG="HiLink" AT+AUTHPWG=?	Set / query the authentication password used for OTA firmware upgrade.	Default "HiLink" → OK
16	AT+ADVI=800 AT+ADVI=?	Set / query the BLE broadcast (advertising) interval. Unit = 625 μs.	Suggested: 80, 160, 320, 800, 1600, 3200 • default 800 → OK
17	AT+CONNI=24 AT+CONNI=?	Set / query the BLE connection interval. Unit = 1.25 ms. Smaller = faster response but higher power; larger = lower power but higher latency.	Range 6–3200 (7.5–4000 ms) Default 24 → OK
18	AT+TS=1	Exit AT Command Mode and resume transparent (pass-through) transmission.	→ OK

8.6 Working Mode

#	Command(s)	Function	Parameter range / Response
19	AT+BTMODE=0 AT+BTMODE=1 AT+BTMODE=2 AT+BTMODE=?	Set / query the Bluetooth working mode.	0: SPP + GATT (BT + BLE) 1: SPP only (BT Classic) 2: GATT only (BLE) → OK
20	AT+BTMAC=?	Query the Bluetooth Classic MAC address.	Read only → BT MAC, then OK



9. Quick-Start Examples

Typical command sequences. Enter AT Command Mode by pressing the **AT EN** button on the module , send the commands, then return to data mode.

A. Configure as a named slave (peripheral)

AT+ROLE=0 — set as slave
AT+NAME="ADIY_SENSOR_01" — set device name
AT+BAUD=115200 — set UART baud
AT+RESET — apply changes

B. Master connecting to a slave by MAC

AT+ROLE=1 — set as master
AT+SCANMODE=0 — connect by MAC
AT+INQ — scan / list nearby devices
AT+PEERMAC=<slave MAC> — connect to the slave

C. Enable secure pairing

AT+ENCRYPT=1 — enable pairing encryption
AT+PSWD=1234 — set 4-digit PIN
AT+RESET — apply changes

10. Connection Diagram (User Breakout)

For most applications the module is used through its six-pin breakout. The connections are shown below.

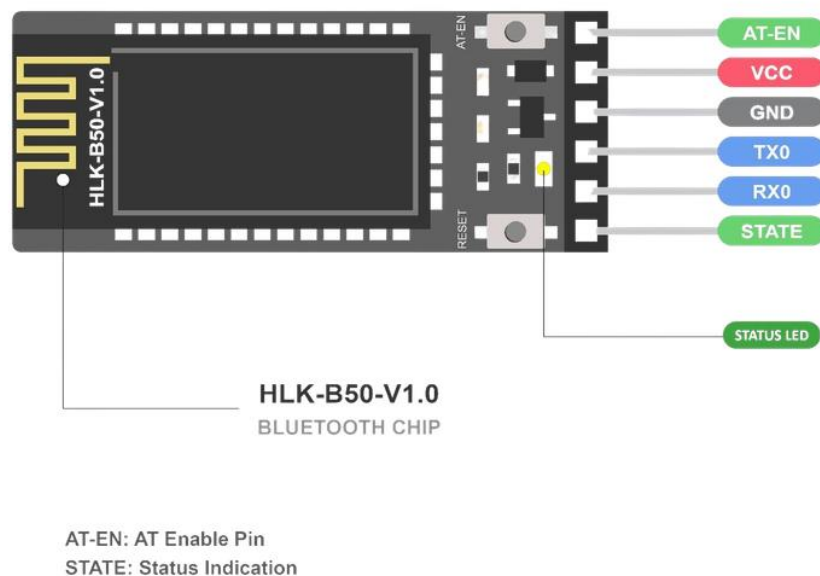


Figure 2 — HLK-B50 breakout pin diagram

Pin	Name	Function
AT-EN	AT enable	Pull low (0.5–3 s) to enter AT Command Mode.
VCC	Power	Supply input 3.5–6 V (on-board regulator). (5V- nominal)
GND	Ground	Power / signal ground.
TX0	UART transmit	Module → host. Connect to host RX.



Pin	Name	Function
RX0	UART receive	Host → module. Connect to host TX.
STATE	Status	Connection status indication output.

— End of document —

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