ARDUINO BLUETOOTH MODULE HC08

The **HC-08** is a Bluetooth module that can be used with Arduino for wireless communication. It operates on **Bluetooth 4.0 (BLE - Bluetooth Low Energy)** and is an alternative to modules like the **HC-05** (Classic Bluetooth) and **HM-10** (another BLE module).

HC-08 Bluetooth Module Pinout

Pin	Function	Connection to Arduino
VCC	Power (3.3V)	3.3V (Do not use 5V!)
GND	Ground	GND
TXD	Transmit Data	Connect to **RX** pin (SoftwareSerial recommended)
RXD	Receive Data	Connect to **TX** pin (SoftwareSerial recommended)
STATE	Connection Status (Optional)	Can be read to check BT connection

⚠ **Warning:** The HC-08 is a **3.3V module**, so do not connect it directly to 5V Arduino pins. Use a **voltage divider** for the RX line if needed.

Arduino HC-08 Wiring Example

Setting Up HC-08

1. **Default Baud Rate**: Usually **9600** (check datasheet).
2. **AT Commands** (Configure HC-08):
    - Enter **AT mode** by sending AT (should return OK).
    - Common commands:
        - AT+NAME? → Check current name.
        - AT+NAME=MyHC08 → Change device name.
        - AT+BAUD? → Check baud rate.

- AT+BAUD4 → Set baud rate to 9600 (4 = 9600).
- AT+PIN1234 → Set PIN to "1234".

Connecting via Smartphone

1. **Pairing**:
    - Enable Bluetooth on your phone.
    - Scan for **HC-08** (default name may be HC-08 or similar).
    - Enter the **default PIN** (often 1234 or 0000).
2. **Using a Bluetooth Terminal App**:
    - Install an app like **Serial Bluetooth Terminal** (Android).
    - Send data from the app → Arduino receives it via BTserial.read().

Troubleshooting

- **No response from HC-08?**
    - Check wiring (TX→RX, RX→TX).
    - Ensure **3.3V power** (not 5V).
    - Try different baud rates (9600, 57600, 115200).
- **AT commands not working?**
    - Some HC-08 modules require AT+ prefix (e.g., AT+NAME?).

HC-08 vs HC-05 vs HM-10

Feature	HC-08 (BLE)	HC-05 (Classic)	HM-10 (BLE)
Bluetooth	4.0 BLE	2.0 (Classic)	4.0 BLE

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Feature	HC-08 (BLE)	HC-05 (Classic)	HM-10 (BLE)
Power Usage	Low	Higher	Low
Range	~30m	~10m	~30m
Baud Rate	Up to 115200	Up to 1382400	Up to 115200

Applications

- Wireless sensor data transmission.
- Remote control of Arduino robots.
- IoT projects (BLE for low power).

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```cpp
#include <SoftwareSerial.h>

SoftwareSerial BTserial(2, 3); // RX, TX (Arduino pins)

void setup() {
  Serial.begin(9600);   // Serial Monitor
  BTserial.begin(9600); // HC-08 default baud rate
  Serial.println("HC-08 Bluetooth Module Ready");
}

void loop() {
  if (BTserial.available()) {
    char data = BTserial.read();
    Serial.print("Received: ");
    Serial.println(data);
  }

  if (Serial.available()) {
    char data = Serial.read();
    BTserial.write(data); // Send to HC-08
  }
}
```

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