



# HAC-EMBEE

## 2.4G Low Power Data Radio Module (Based on ZigBee protocol) V1.0



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## I Features of HAC-EMBEE V1.0

HAC-EMBEE V1.0 is a kind of low power wireless module based on EMBER Zigbee protocol stack. The features are shown as below:

1. Low power transmission with 18.5dBm, and receiving sensitivity is -105dBm (BER=10<sup>-2</sup>).
2. ISM frequency band with no require of applying frequency. The carrier frequency is 2.4GHz.
3. High anti-interference and Low BER (Bit error Rate)
4. The transmitting speed in the air can reach up to 250kbps.

5. Transmission Distance

Within the visible range, when the antenna is placed at 2m high, the reliable transmission distance is 1000m.

6. Multi-channels

HAC-EMBEE V1.0 offers 16 channels. It will select the suitable and reliable communication channel automatically according to the user's environment.

7. UART interface

HAC-EMBEE V1.0 provides a UART interface of TTL level.

8. Low power consumption

The receiving current is less than or equal to 50mA, and the transmitting current is less than or equal to 200mA.

9. Small size and light weight

10. By using monolithic radio-frequency integrated circuit and single-chip MCU, the transceivers have less peripheral circuits, higher reliability, and lower failure rate.

11. Offering many kinds of antenna connecting methods, such as PCB antenna, Chip antenna, RF connector for antenna and so on.

12. It can meet for the protocol of Zigbee/SE1.1 for 2.4GHz, it can make topology network

## II. Applications of HAC-EMBEE V1.0

HAC-EMBEE V1.0 low power wireless module is suitable for:

- \* Home appliances intelligent control.
- \* Auto Meter Reading system.
- \* Industry telemetry and automatic data collection system.
- \* Security and alarm.



- \* Wireless monitor for hotel and equipment of computer room, door's security, personnel orientation.
- \* Traffic and the control for street lamp.
- \* Logistics, active RFID, POS system and wireless handheld terminal.

### III. Technical Specs of HAC-EMBEE V1.0

#### 3.1 Technical Parameter of HAC-EMBEE V1.0

Name	Parameter			Unit
	Minimum	Typical Value	Maximum	
<b>Electric Performance (25°C)</b>				
Power Supply	3.0	3.3	3.6	V
Interface Level	-0.3		VCC+0.3≤3.6 V	V
Transmitting Current	160	180	190	mA
Receiving Current	31	35	40	mA
Sleeping Current		<b>T.B.D</b>		μA
<b>Wireless Performance (25°C)</b>				
Working Frequency	2.405		2.485	GHz
Transmitting Power	18	18.5	20	dBm
Receiving Sensitivity		-105		dBm
Transmitting Rate		250		Kbps
<b>General Performance</b>				
Interface baud rate	1200	38400	115200	bps
Working Temperature	-40		80	°C
Size	35.5 × 25.4 × 8.7			mm

Table 1 Technical Parameter of HAC-EMBEE V1.0

#### 3.2 The Dimension of HAC-EMBEE V1.0 (35.5 × 25.4 × 8.7mm)

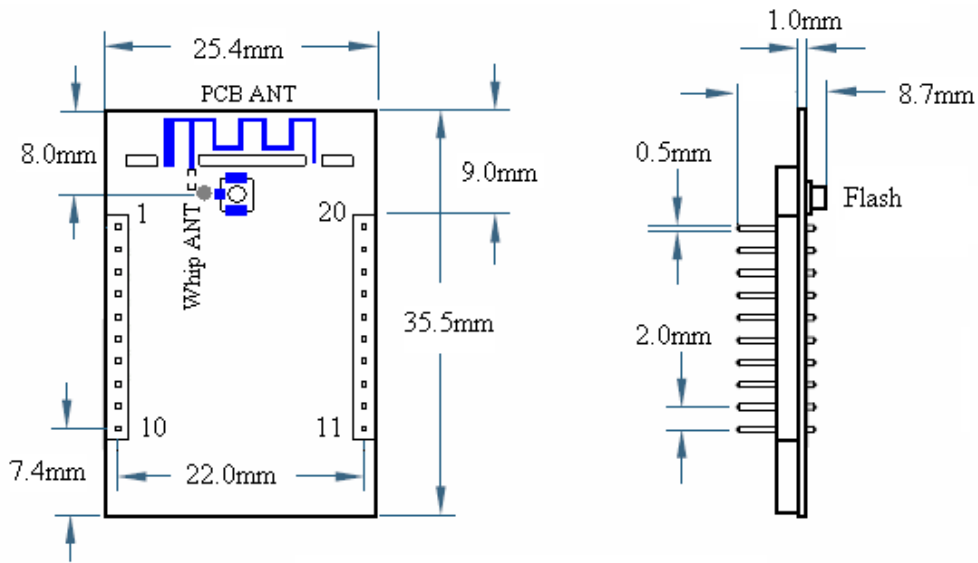


Figure1. The dimension of HAC-EMBEE V1.0

### 3.3 Pin Definition of HAC-EMBEE V1.0

Pin	Definition	IN/OUT	Description
1	VCC	IN	VCC, 3.0~3.6V
2	UART_TXD	OUT	Serial data output
3	UART_RXD	IN	Serial data input
4	GPIO1	IN/OUT	GPIO
5	RESET	IN	Reset(Low active)
6	Button0	IN	UART mode selection(meter or console mode)
7	Button1	IN	Reserved (commissioning of the network)
8	SWDIO	IN/OUT	Data for Program
9	SWDCLK	IN/OUT	CLK for Program
10	GND		Ground
11	LED0	OUT	Reserve for LED
12	LED1	OUT	Reserve for LED
13	GPIO2	IN/OUT	GPIO



14	GPIO3	IN/OUT	GPIO
15	GPIO4	IN/OUT	GPIO
16	GPIO5	IN/OUT	GPIO
17	VREF/GPIO	IN/OUT	Reserve for ADC reference voltage or GPIO
18	ADC0	IN/OUT	Analog input0
19	ADC1	IN/OUT	Analog input1
20	ADC2	IN/OUT	Analog input2

**Table 2 Pin Definition of HAC-EMBEE V1.0**

### 3.4 HAC-EMBEE V1.0 Optional fittings

1) Standard fittings

Standard HAC-EMBEE V1.0 always goes with PCB antenna, excluding RF connector.

2) There is an optional Chip antenna called HAC-Antenna-CH2400 for customers.

When using Chip antenna, it needs to cut down the PCB antenna connection and connect with pad of Chip antenna. In such fittings, it doesn't include RF connector.

3) External antenna for customer. if customer prefer it. We have to mount RF connector.