Crowtail- LoRaWAN Lora RA-08H Module DataSheet

V1.0

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1 Overview

1.1 Product Description

The Crowtail-LoRa RA-08H is a module specifically designed for long-distance, low-power wireless communication, with its core functions built around the RA-08H module. The ASR6601 chip it carries, as a universal LPWAN wireless communication SoC, integrates a high-performance RF transceiver, a multi-mode modem, and a 32-bit RISC MCU, enabling efficient handling of communication and control tasks.

The module excels in communication performance, supporting multiple modulation modes such as LoRa, (G)FSK, BPSK, and (G)MSK. It is compatible with the 803~930MHz frequency band, covering various mainstream LoRaWAN frequency bands including EU868, US915. The theoretical maximum transmit power reaches +22dBm, and the receiving sensitivity is as high as -138dBm@125Kz SF12. With the adjustment of spreading factors from SF5 to SF12, the maximum transmission distance can reach 1km in an ideal open environment, and can be extended to 4.8km when paired with a suction cup antenna, meeting the long-distance communication needs in various scenarios.

Meanwhile, the module features download and communication switching functions, supports user-defined programming, and is equipped with an IPEX-1 socket for easy antenna connection. Its overall dimensions are 40

(L) * 20 (W) * 7.5 (Ht) mm, making it suitable for numerous IoT application scenarios such as intelligent instruments, supply chain logistics, and home and building automation.

1.2 Key Features

- **Transmit Power:**Theoretical maximum output power of +22dBm, ensuring strong signal transmission for long-range communication.
- **Supported Frequency Bands:**Covers 803–930MHz, including major LoRaWAN frequency plans such as EU868, US915, making it adaptable to diverse communication environments.
- **Receiver Sensitivity:**Ultra-high sensitivity of -138dBm @125kHz (SF12), enabling reliable detection of weak signals for improved data reception.
- **Adjustable Spreading Factor (SF):**Supports SF5 to SF12, allowing flexible optimization of communication performance based on range and environmental conditions.
- **Modulation Schemes:**Supports LoRa, (G)FSK, BPSK, and (G)MSK, providing versatility for different communication requirements.
- **Transmission Range:**Up to 1km in open-space ideal conditions, extendable to 4.8km with a whip antenna.
- **Functional Capabilities:**Supports firmware download and communication mode switching, along with user-customizable programming for flexible application-specific enhancements.
- **Hardware Design:**Equipped with an IPEX-1 antenna connector for easy antenna attachment.

- Compact dimensions of 40mm (L) × 20mm (W) × 7.5mm (H), ensuring easy integration and deployment.

1.3 Application Scenarios

- Smart Instrumentation
- Smart City Infrastructure
- Environmental Monitoring
- Supply Chain & Logistics
- Home & Building Automation
- Security Systems
- Remote Irrigation Systems
- And other IoT applications

2 Product Appearance

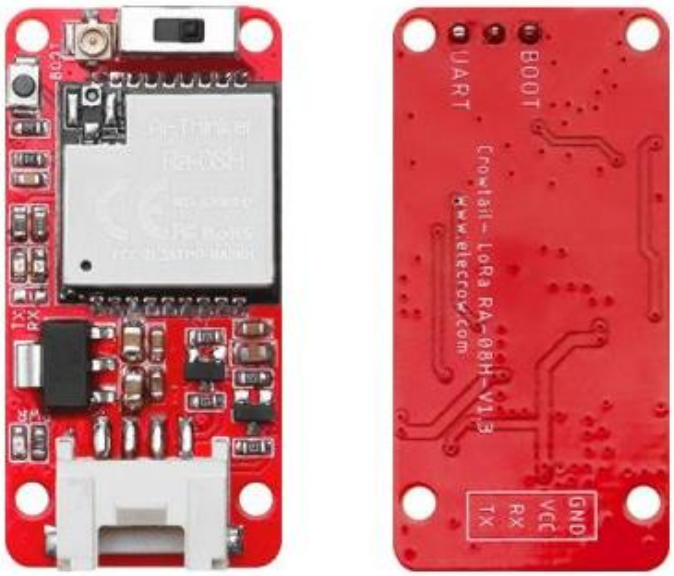

Figure 1:Front & Rear Views of Crowtail-LoRa RA-08H

Figure 2:Side View of Crowtail-LoRa RA-08H

3 Dimension Diagram

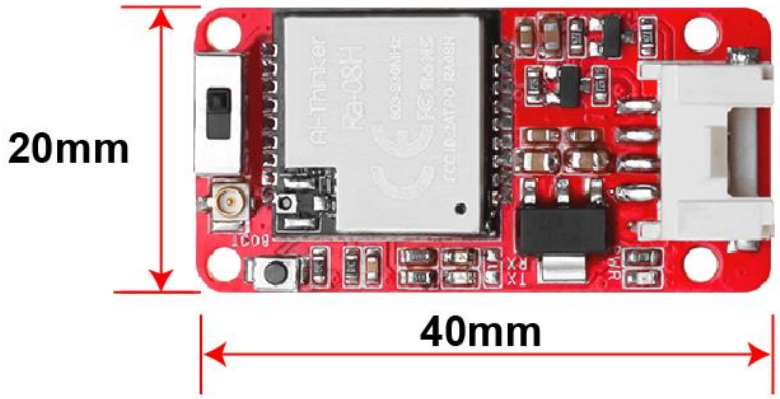

Figure 3:Dimension Diagram

4 System Block Diagram

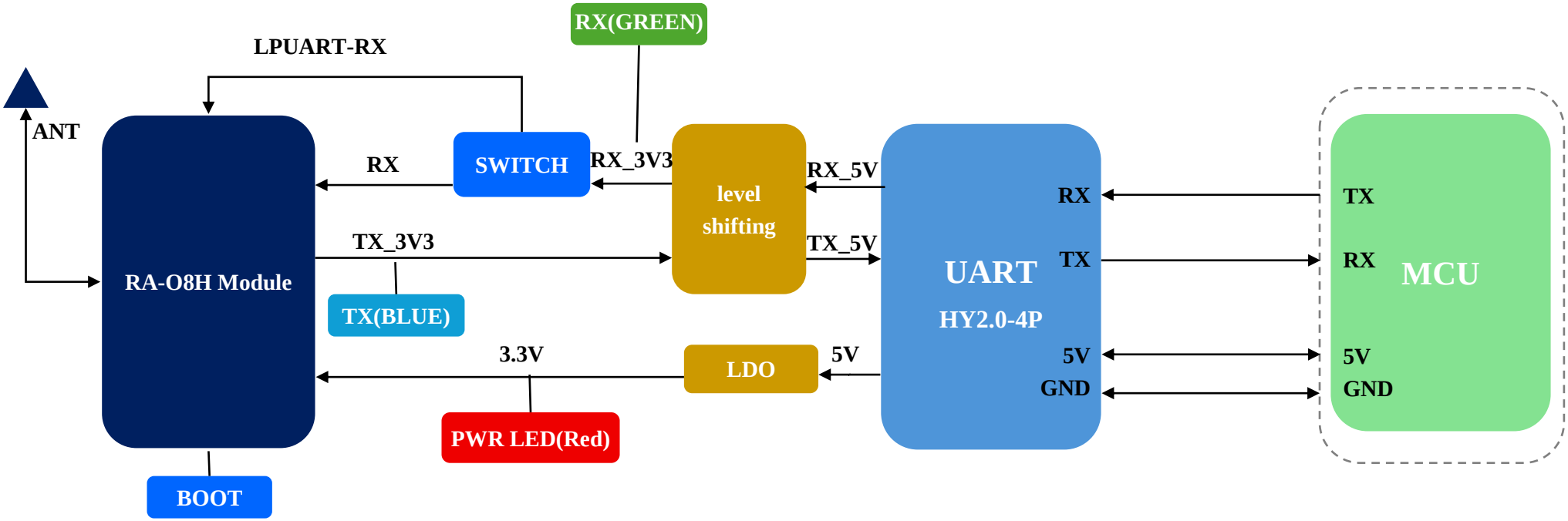

Figure 4:System Block Diagram

5 Hardware Overview

The hardware overview section details the pin definitions and functional descriptions of the Crowtail-LoRa RA-08H, covering the pin mappings and specifications for buttons/indicators and various interfaces.

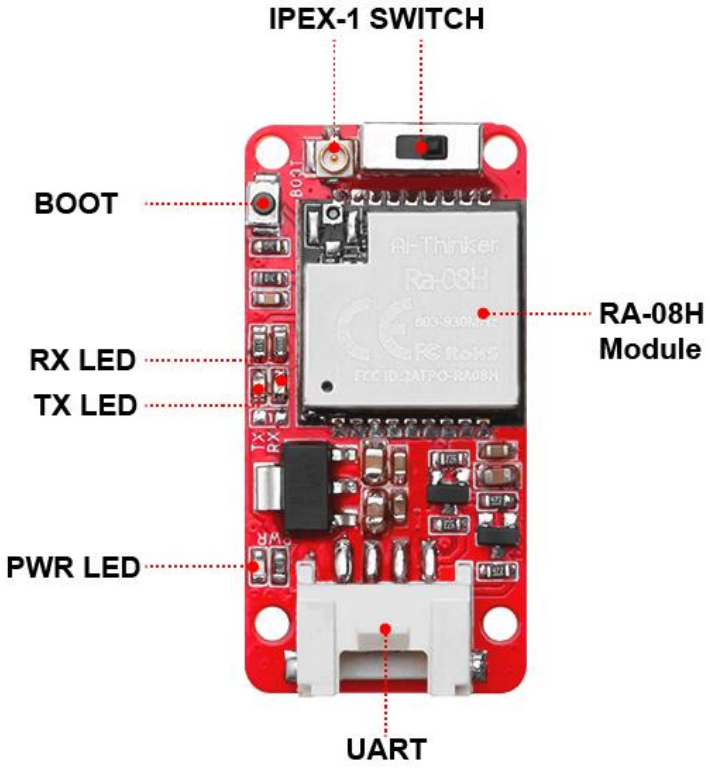

Figure 5:Crowtail-LoRa RA-08H Interface Diagram

5.1 Button Pin Definitions and Functions

No.	Product Group	Button/Switch Name	Silkscreen	State	Pin	Module Pin	Description
1	Crowtail-LoRa RA-08H	BOOT	BOOT	Press & Hold	LR_BOOT	BOOT/GPIO2	For the RA-08H-BOOT button, press and hold it before powering on to put the RA-08H module into firmware burning mode.
2		SWITCH	/	The switch can toggle between UART-RX and LPUART-RX modes	LPUART-RX UART-RX	LPUART-RX/IO6 UART/IO16	1.When the switch is toggled to UART-RX (under BOOT mode), it acts as the serial port for RA-08H firmware burning. 2.When toggled to LPUART-RX, it is in normal communication mode and serves as the serial port for sending AT commands.

5.2 Indicator LED Pin Definitions and Functions

No.	Product Group	LED Name	Silkscreen	Color	Pin	Module Pin	Description
1	Crowtail-LoRa RA-08H	RX LED	RX	GREEN LED	UART-RX	U0RX/IO16	Lights up when the module receives data through the UART interface, indicating the data reception status.
2		TX LED	TX	BLUE LED	UART-TX	U0TX/IO17	Lights up when the module sends data through the UART interface, indicating the data transmission status.
3		PWR	PWR	RED LED	3V3	3.3V	Remains on when the module is powered on, indicating that the power supply is normal.

5.3 Interface Pin Definitions and Functions

No.	Interface Name	Silkscreen	Pins	Module Pins	Description
1	UART Interface	UART	GND 5V RX TX	/ / UART-RX UART-TX	The UART interface serves as the critical serial communication channel between the module and external devices (e.g., controllers, host computers). It establishes common ground through GND, provides 5V power supply, and enables bidirectional data transmission via RX/TX lines for command interaction and data exchange.
2	IPEX-1 Antenna Connector	ANT	/	/	External LoRa spring antenna connection (supports 868MHz/915MHz bands) for enhanced wireless signal transmission/reception capabilities and extended communication range.

6 Technical Specifications

No.	Parameter Category	Specific Parameter	Crowtail-LoRa RA-08H
1	Integrated Module	Module Name	RA-O8H Module
2	MCU	Processor	Based on the ASR6601 chip, it features a built-in 32-bit RISC MCU with an ARM Cortex-M4 core, operating at a frequency of 48MHz.
3		RAM	16KB
4		Flash	128KB
5	RF Module Characteristics	RF Chip	ASR6601
6		Transmit Power	The theoretical maximum transmit power is +22dBm
7		Receiver Sensitivity	-138dBm@125kz SF12
8		LoRaWAN Protocol	Class A/B/C (compliant with LoRaWAN 1.0.3 specification)
9		Supported Bands	EU868, US915
10		Frequency Range	803-930MHz
11		Modulation Schemes	LoRa®, (G)FSK, (G)MSK, BPSK
12		Supported Spreading Factors	SF5-SF12
13		Communication Distance	In public areas, the maximum communication distance of the antenna can reach up to 4.8km.
14	Module Mechanical Characteristics	Operating Voltage	2.7 - 3.6V
15		Antenna Type	Half-hole pad, through-hole pad, or IPEX connector
16		Package Type	18-SMD module
17		Module Dimensions	16mm*16mm*3.2mm（±0.2）mm
18	Antenna Measurement Range	Urban Communication Range	868:1km 915:1.2km
19	Mechanical Properties	Dimensions	20*40*7.5mm
20	Electrical Characteristics	Operating Voltage	DC 5V/1A

21		Low Power Consumption	115μA
22		Deep Sleep Power Consumption	0.9μA
23		standby power consumption	0.28W
24	Functions	Communication Interfaces	● UART interface ● IPEX-1 antenna interface: Lora spring antenna (868Mhz/915Mhz)
25		LED	RX LED (GREEN) TX LED (BLUE) PWR LED(RED)
26		SWITCH/Buttons	SWITCH BOOT

7 Environmental Characteristics

NO.	Item	Description	Minimum Value	Typical Value	Maximum Value	Unit
1	VDD	Supply Voltage	3.3	5	5.5	V
2	TOPR	Operating Temperature	-40	25	+85	℃

8 Related Documents

- **Crowtail- LoRaWAN Lora LR1262/RA-08H Module Product Link**
- **RA-08H Module Datasheet**
- **SX1261/2 Datasheet**

9 Revision History

Date	Version	Release Notes
2025/8/31	V1.0	First release