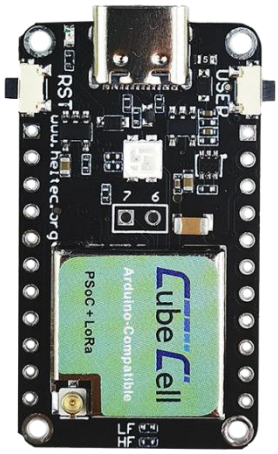
HTCC-AB01_V2

LoRa Node Development Kit



Document version

Version	Time	Description	Remark
V1.0	2022-08-16	Documents creating	肖鸿
V1.1	2022-09-21	Document structure update	Aaron

Copyright Notice

Disclaimer

Chengdu Heltec Automation Technology Co., Ltd. reserves the right to change, modify or improve the document and product described herein. Its contents are subject to change without notice. These instructions are intended for you use.

Content

1. Description

1.1 Overview

HTCC-AB01 is Cubecell(TM) Series made by Heltect team, mainly for LoRa/LoRaWAN node applications.

HTCC-AB01 is based on ASR6052, the chip is already integrated with the PSoC® 4000 series MCU (ARM® Cortex® M0+ Core) and SX1262. We have done a lot of migration and development, made it perfectly support Arduino®, can run the LoRaWAN protocol stably, can easily connect lithium batteries and solar panels. HTCC-AB01 is a Dev-Board. Friendly designed for developers, easy to verify communication solutions.

HTCC-AB01 product model list:

Table 1.1: Product model list

No.	Model	Description
1	HTCC-AB01-LF	470~510MHz working LoRa frequency, used for China mainland (CN470) LPW band.
2	HTCC-AB01-HF	For EU868, IN865, US915, AU915, AS923, KR920 and other LPW networks with operating frequencies between 863~928MHz.

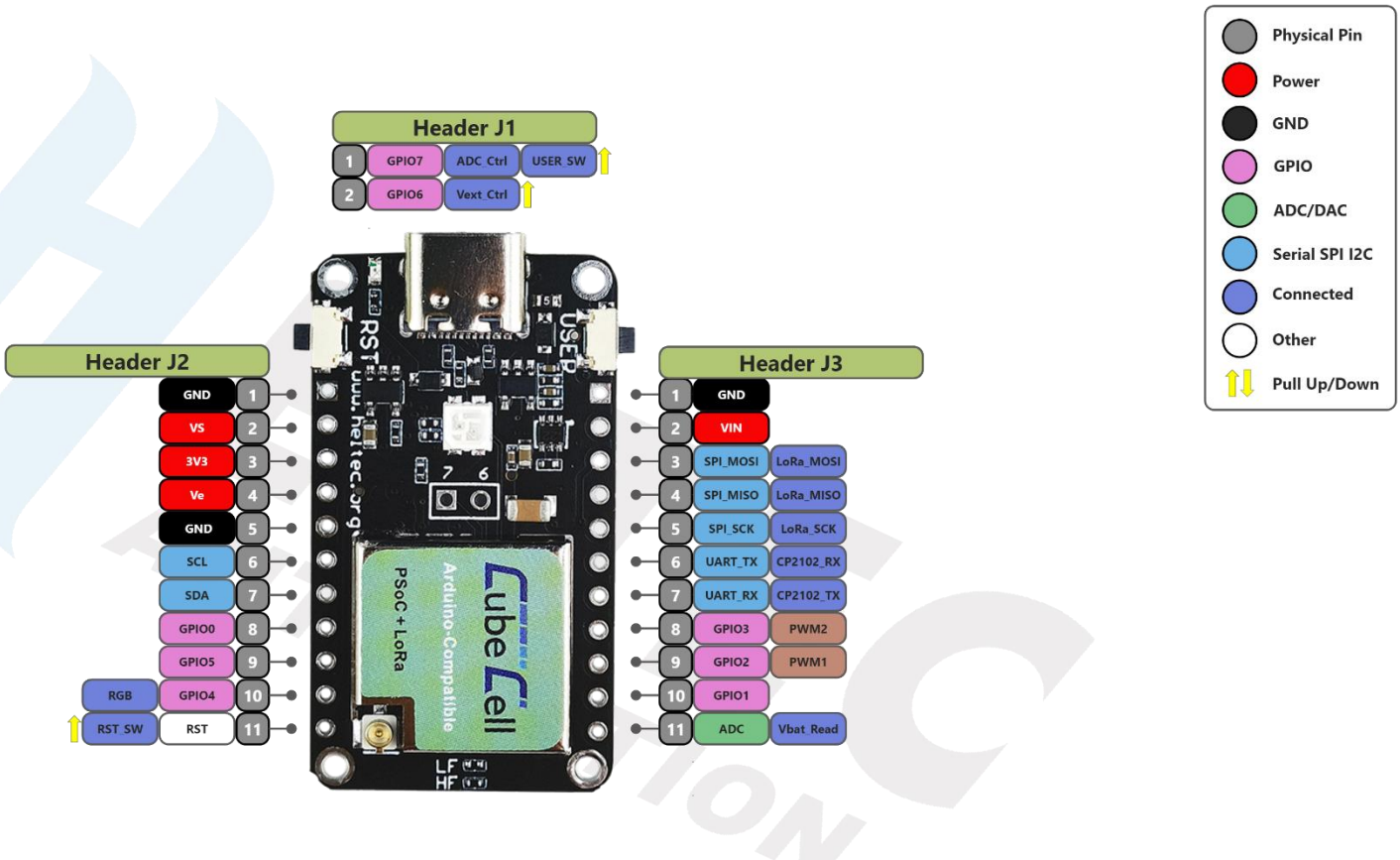
1.2 Product features

- Perfect Arduino-Compatible;
- CE and FCC certification;
- Based on ASR605x (ASR6501, ASR6502), those chips are already integrated the PSoC® 4000 series MCU (ARM® Cortex® M0+ Core) and SX1262;

- LoRaWAN 1.0.2 support;
- Ultra low power design, 3.5uA in deep sleep;
- Onboard solar energy management system, can directly connect with a 5.5~7V solar panel;
- Onboard SH1.25-2 battery interface, integrated lithium battery management system (charge and discharge management, overcharge protection, battery power detection, USB / battery power automatic switching);
- Micro USB interface with complete ESD protection, short circuit protection, RF shielding, and other protection measures;
- Integrated CP2102 USB to serial port chip, convenient for program downloading, debugging information printing;
- Good impendence matching and long communication distance.

2. Pin Definition

2.1 Pin assignment



HTCC-AB01_V2 Pin map

2.2 Pin description

- **Header J1**

Table 2.2-1: Pin description

No.	Name	Type	Function
1	7	I/O	GPIO7, VBAT_ADC_CTL, USER_KEY.
2	6	I/O	GPIO6, Vext enable.

Header J2

Table 2.2-2: Pin description

No.	Name	Type	Function
1	GND	P	Ground
2	VS	P	Solar energy input
3	3V3	P	3.3V power supply
4	Ve	P	External power supply output
5	GND	P	Ground
6	SCL	I/O	I2C_SCL
7	SDA	I/O	I2C_SDA
8	0	I/O	GPIO0
9	5	I/O	GPIO5
10	4	I/O	GPIO4, RGB_Ctrl
11	RST	I	RESET

Header J3

Table 2.2-3: Pin description

No.	Name	Type	Function
1	GND	P	Ground
2	VIN	P	5V power supply
3	MO	I/O	Internal connection to LoRa_MOSI
4	MI	I/O	Internal connection to LoRa_MISO
5	SCK	I/O	Internal connection to LoRa_SCK

6	TX	I/O	UART_TX. Connect to USB bridge chip
7	RX	I/O	UART_TX. Connect to USB bridge chip
8	3	I/O	GPIO3
9	2	I/O	GPIO2
10	1	I/O	GPIO1
11	ADC	I	ADC_IN2[1]

3. Specifications

3.1 General specifications

Table 3.1: General specifications

Parameters	**Description**
Master Chip	ASR6502 (48 MHz ARM® Cortex® M0+ MCU)
LoRa Chipset	SX1262
Frequency	470~570MHz, 863~928MHz
Max TX Power	21±1dBm
Receiving sensitivity	-134dBm
USB to Serial Chip	CP2102
Hardware Resource	1*SPI; 1*I2C; 1*UART; 1*12-bit ADC; 1*SWD; 8*GPIO; 2*PWM; 8-Channel DMA engine
Memory	128Kbites FLASH; 16Kbites SRAM

[1] ADC_IN2 for external ADC; ADC_IN1 is used to read the lithium battery voltage, the voltage of the lithium battery is:

$$V_{BAT} = 2*V_{ADC\_IN1}$$

Interface	Type-C USB; LoRa ANT (IPEX 1.0); SH1.25; 2*2.54*11 Pin Header; 1*2.54*2 Pin Header
Battery	3.7V lithium battery power supply and charging
Solar Energy	VS pin can be connected to 5.5 ~ 7V solar panel
Power consumption	Deep Sleep 3.5uA
Operating temperature	-20~70℃
Dimensions	40.64 * 22.86 * 7.6 mm

3.2 Power supply

Except when USB or 5V Pin is connected separately, lithium battery can be connected to charge it. In other cases, only a single power supply can be connected.

Table 3.2: Power supply

Power supply mode	Minimum	Typical	Maximum	Company
Type-C USB(≥500mA)	4.7	5	6	V
Lithium battery(≥250mA)	3.3	3.7	4.2	V
5V pin(≥500mA)	4.7	5	6	V
3V3 pin(≥150mA)	2.7	3.3	3.5	V

3.3 Power output

Table 3.3: Power output

Output Pin	Minimum	Typical	Maximum	Company
3.3V Pin			500	mA

5V Pin (USB Powered only)			500	mA
Vext Pin			350	mA

3.4 Power characteristics

Table 3.4: Power characteristics

Mode	Condition	Min.	Typical	Max.	Company
TX	14dBm, USB powered, 868		150		mA
	17dBm, USB powered, 868		170		mA
	22dBm, USB powered, 868		185		mA
RX	TX disabled; RX enabled		30		mA
sleep	USB powered		10		mA
	VBAT/battery powered		11		uA
	3.3V header powered		3.5		uA

3.5 LoRa RF characteristics

3.5.1 Transmit power

Table3.5.1: Transmit power

Operating frequency band	Maximum power value/[dBm]
470~510	21 ± 1
867~870	21 ± 1
902~928	21 ± 1

3.5.2 Receiving sensitivity

The following table gives typically sensitivity level of the HTCC-AB01.

Table3.5.2: Receiving sensitivity

Signal Bandwidth/[KHz]	Spreading Factor	Sensitivity/[dBm]
125	SF12	-134
125	SF10	-130
125	SF7	-122

3.6 Operation Frequencies

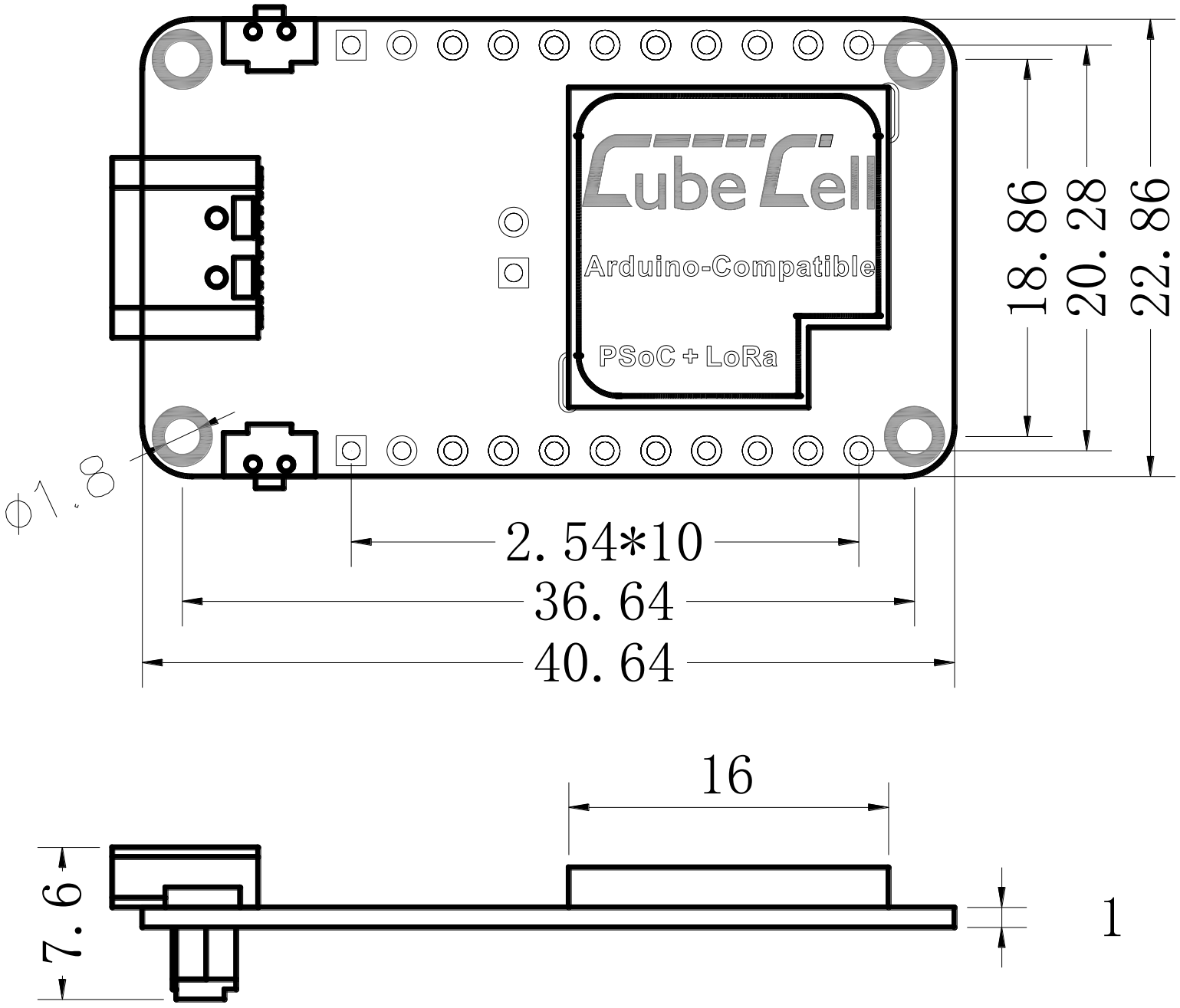
HTCC-AB01 supports LoRaWAN frequency channels and models corresponding table.

Table3.6: Operation Frequencies

Region	Frequency (MHz)	Model
EU433	433.175~434.665	HTCC-AB01-LF
CN470	470~510	HTCC-AB01-LF
IN868	865~867	HTCC-AB01-HF
EU868	863~870	HTCC-AB01-HF
US915	902~928	HTCC-AB01-HF
AU915	915~928	HTCC-AB01-HF
KR920	920~923	HTCC-AB01-HF
AS923	920~925	HTCC-AB01-HF

4. Hardware resource

4.1 Physical dimensions



5. Resource

5.1 Relevant Resource

- Source Code
  - Cubecell-Arduino framework
- Schematic diagram
- Pin map
- Downloadable resource

5.2 Contact Information

Heltec Automation Technology Co., Ltd

Chengdu, Sichuan, China

Email: support@heltec.cn

Phone: +86-028-62374838

https://heltec.org