HT-AM01

LoRa module

Document version

Version	Time	Description
Rev. 1.0	2020-4-30	Preliminary version
Rev. 1.1	2020-9-16	Typographic modification

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Catalogue

1. Description

1.1 Overview

CubeCell (TM) is a new product series made by Heltec team, mainly for LoRa/LoRaWAN node applications.

CubeCell (TM) series is based on ASR605x (ASR6501, ASR6502), those chips are 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, and can easily connect lithium batteries and solar panels.

HTCC-AM01 is a Module. Supports AT transparent transmission commands, can be directly integrated into the application circuit.

HT-AM01 are available in two product variants:

Table 1.1 Product model list

No.	Model	Description
1	HT-AM01-LF	470~510MHz working LoRa frequency, used for China mainland (CN470) LPW band.
2	HT-AM01-HF	For EU868, IN865, US915, AU915, AS923, KR920 and other LPW networks with operating frequencies between 863~928MHz.

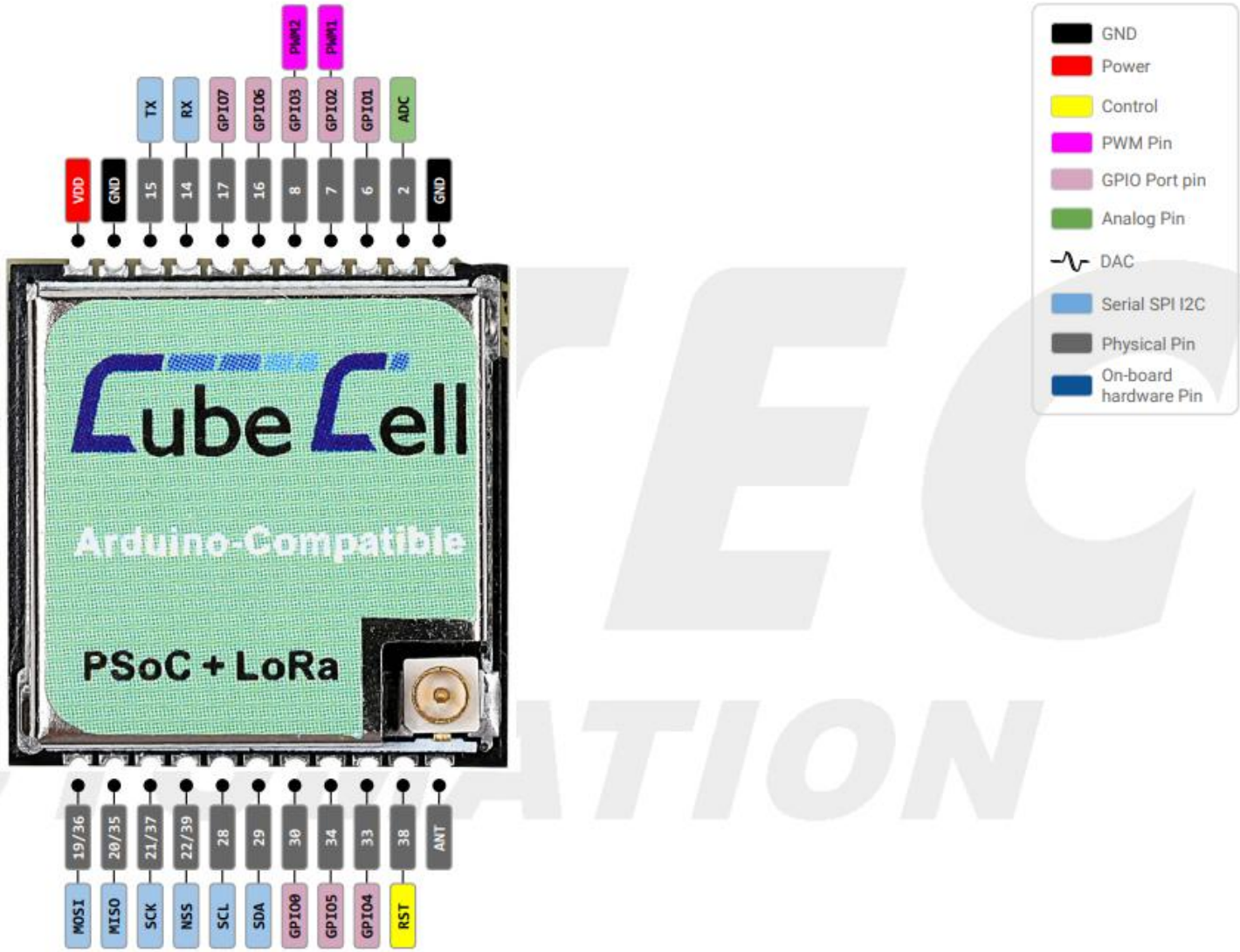
1.2 Product features

- 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;
- 1.27 stamp edge design for SMT;
- Good impendence matching and long communication distance.

2. Pin Definition

2.1 Pin assignment



2.2 Pin description

Table 2.2 Pin description

No.	Name	Type	Function
1	UART_TX	I/O	UART_TX
2	UART_RX	I/O	UART_RX
3	0	I/O	GPIO0; I2C0_SDA; I2C0_SCL; XIN
4	1	I/O	GPIO1; I2C0_SCL; I2C0_SDA; XOUT; ADC_IN2
5	2	I/O	GPIO2
6	3	I/O	GPIO3
7	GND	P	Ground
8	VDD	P	3.3V Power Supply
9	VDD	P	3.3V Power Supply
10	4	I/O	GPIO4; ADC_IN10
11	5	I/O	GPIO5
12	6	I/O	GPIO6
13	GND	P	Ground
14	ANT	O	LoRa ANT
15	GND	P	Ground
16	GND	P	Ground
17	GND	P	Ground
18	GND	P	Ground
19	GND	P	Ground
20	7	I/0	GPIO7
21	8	I/O	GPIO8
22	9	I/O	GPIO9
23	10	I/O	GPIO10
24	RST	I	Pull down to RESET
25	11	I/O	GPIO11; USART0_RX; UART1_RX
26	12	I/O	GPIO12; UART0_RX
27	SWD	I/O	SWDIO
28	SWC	I/O	SWCLK; USART0_TX
29	13	I/O	GPIO13; USART0_TX; I2C0_SCL
30	WAKE	I	Pull up to WAKE UP; USART0_RX; I2C0_SDA

3. Specifications

3.1 General specifications

Table 3.1: General specifications

Parameters	Description
Master Chip	ASR6501 (48 MHz ARM® Cortex® M0+ MCU)
LoRa Node Chip	SX1262
Frequency	433~470 MHz, 865~923 MHz
Max. TX Power	21 ± 1 dBm
Max. Receiving sensitivity	-135 dBm
Wireless Communication	LoRa, Peer-to-peer communication or LoRaWAN
Hardware Resource	UART x 1; SPI x 1; I2C x 1; SWD x 1; 12-bit ADC input x 1; 8-channel DMA engine; GPIO x 8
Memory	128KB internal FLASH; 16KB internal SRAM
Interface	LoRa Antenna Interface (IPEX) x 1; 11 x 1.27 Stamp Hole x 2
Power consumption	3.5μA (deep sleep mode)
Operating temperature	-20 ~ 70 ℃
Dimensions	18mm x 18mm x 3 mm

3.2 Electrical characteristics

3.2.1 Power supply

Table 3.2 Power supply

Power supply mode	Minimum	Typical	Maximum	Company
3V3 pin (≥150mA)	2.7	3.3	3.5	V

3.2.2 Power characteristics

Table3.2 Power characteristics

Electrical Features	Condition	Min.	Typical	Max.	Company
Power Consumption(mA)	LoRa RX Mode		10		mA
	LoRa 10dB output		70		mA
	LoRa 14dB output		90		mA
	LoRa 17dB output		100		mA
	LoRa 20dB output		105		mA
	Sleep Mode (3.3V Pin powered)		3.5		μA

3.3 RF characteristics

3.3.1 Transmit power

Table3.3.1 Transmit power

Operating frequency band (MHz)	Maximum power value/[dBm]
470~510	21 ± 1
863~870	21 ± 1
902~928	21 ± 1

3.3.2 Receiving sensitivity

The following table gives typically sensitivity level of the HT-AM01.

Table3.3.2 Receiving sensitivity

Signal Bandwidth/[KHz]	Spreading Factor	Sensitivity/[dBm]
125	SF12	-139
125	SF10	-130
125	SF7	-124

3.4 Operation frequencies

HT-AM01 supports LoRaWAN frequency channels and models corresponding table.

Table3.4 Operation frequencies

Region	Frequency (MHz)	Model
EU433	433.175~434.665	HT-AM01-LF
CN470	470~510	HT-AM01-LF
IN868	865~867	HT-AM01-HF
EU868	863~870	HT-AM01-HF
US915	902~928	HT-AM01-HF
AU915	915~928	HT-AM01-HF
KR920	920~923	HT-AM01-HF
AS923	920~925	HT-AM01-HF

4. Hardware resource

4.1 Physical dimensions

5. Resource

5.1 Relevant Resource

- CubeCell Module framework
- Pin map
- Downloadable resource

5.2 Contact Information

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