



## HT-1303

# LoRaWAN Concentrator Module





## Document version

Version	Time	Description	Remark
Rev. 1.0	2022-8-16	Preliminary version	肖鸿
Rev. 1.1	2022-10-8	Typographic modification	Aaron

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# 1. Description

## 1.1 Overview

HT-1303 is a LoRa gateway module with industrial standard mini-PCI express form factor based on SX1303 + SX1250 chipset. This mPCIe module can be used in any embedded platform offering a free mPCIe slot with SPI connectivity and capable of providing enough power for the module, enables low-power wide area communication capabilities to your new gateway design or existing industrial routers/computer.

HT-1303 is a complete and cost efficient LoRa gateway solution, offering up to ten programmable parallel demodulation paths, 8 x SF5 ~ SF10 or 8 x SF5 ~ SF12 LoRa demodulators. It can detect uninterrupted combination of packets at 8 different spreading factors and 10 channels with continuous demodulation of up to 16 packets. It targets Internet-of-Things (IoT) applications, covering up to 1000 nodes per square kilometer in an environment with moderate interference.

HT-1303 LoRaWAN concentrator module are available in six product variants:

Table 1.1: Product model list

No.	Model	Frequency band	Transmit power[dBm]
1	HT1303-SPI-470T510	470~510	21±1
2	HT1303-USB-470T510	470~510	21±1
3	HT1303-SPI-863T870	863~870	26±1
4	HT1303-USB-863T870	863~870	26±1
5	HT1303-SPI-902T928	902~928	26±1
6	HT1303-USB-902T928	902~928	26±1

## 1.2 Product features

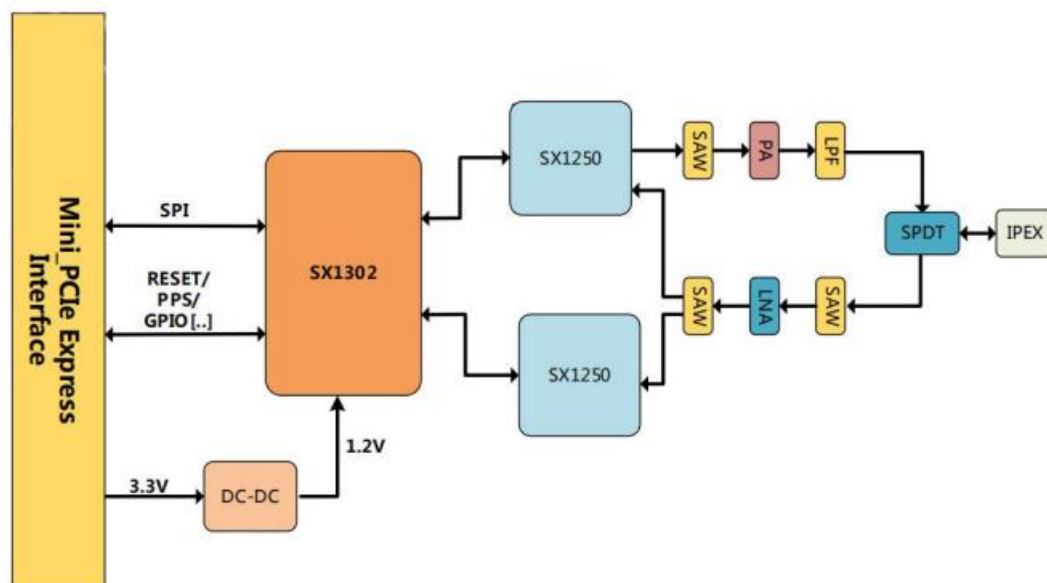
- 125kHz LoRa reception with:

<https://heltec.org>



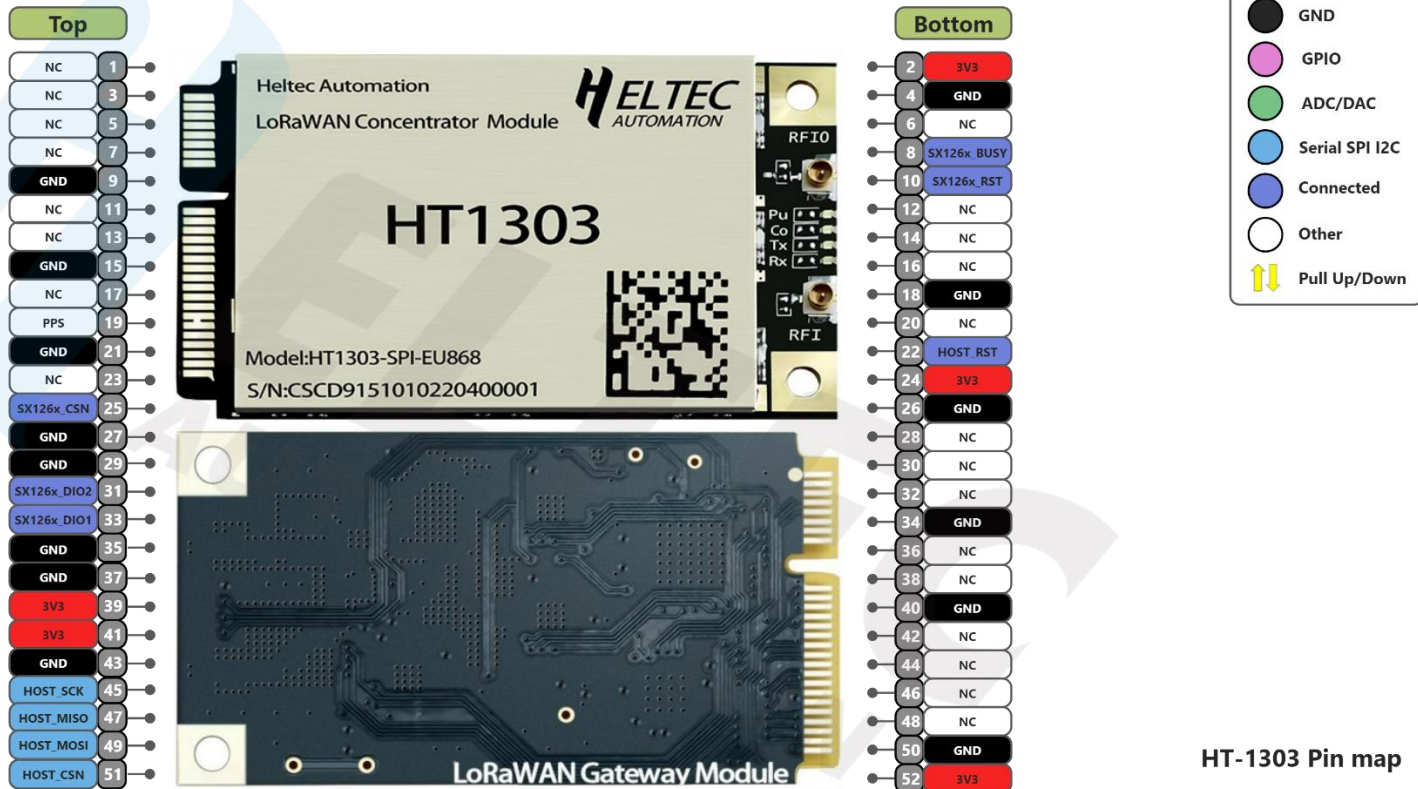
- ✧ 8 x 8 channels LoRa packet detectors.
- ✧ 8 x SF5-SF12 LoRa demodulators.
- ✧ 8 x SF5-SF10 LoRa demodulators.
- ✧ Up to 8 packets can be received simultaneously when Fine Timestamp is enabled.
- ✧ 125/250/500kHz LoRa demodulator.
- ✧ (G)FSK demodulator.
- SPI Interface: The SPI interface gives access to the configuration register of SX1303 via a synchronous full-duplex protocol.
- Compact min-PCI express form factor TYP. 50.95\*30\*10.5mm (W\*L\*H)
- Environmentally friendly RoHS compliant
- Voltage of mini PCI-e is 3.3V, compatible with 3G/LTE mPCIe card
- Tx power up to 27dBm, Rx sensitivity down to -139dBm@SF12, BW125kHz

### 1.3 Function block diagram



## 2. Pin Definition

### 2.1 Pin assignment



HT-1303 Pin map



### 2.2 Pin description

Table 2.2 Pin definition

No.	Name	Type	Function
1	NC	N/A	No connection
2	3V3	P	3.3V Power supply
3	NC	N/A	No connection
4	GND	P	Ground
5	NC	N/A	No connection



6	NC	N/A	No connection
7	NC	N/A	No connection
8	NC	N/A	No connection. Reserved for <b>SX126x_BUSY</b> .
9	GND	P	Ground
10	NC	N/A	No connection. Reserved for <b>SX126x_NRST</b> .
11	NC	N/A	No connection
12	NC	N/A	No connection
13	NC	N/A	No connection
14	NC	N/A	No connection
15	GND	P	Ground
16	NC	N/A	No connection
17	NC	N/A	No connection
18	GND	P	Ground
19	PPS	O	GPS time pulse input, Leave open if.
20	NC	N/A	No connection
21	GND	P	Ground
22	HOST_RST	I	Active high resets SX1303.
23	NC	N/A	No connection
24	3V3	P	3.3V Power supply
25	NC	N/A	No connection. Reserved for <b>SX126x_CSN</b> .
26	GND	P	Ground
27	GND	P	Ground
28	NC	N/A	No connection



29	GND	P	Ground
30	NC	N/A	No connection. Reserved for <b>internal temperature detection sensor SCL</b> .
31	NC	N/A	No connection. Reserved for <b>SX126x_DIO2</b> .
32	NC	N/A	No connection. Reserved for <b>internal temperature detection sensor SDA</b> .
33	NC	N/A	No connection. Reserved for <b>SX126x_DIO2</b> .
34	GND	P	Ground
35	GND	P	Ground
36	NC	N/A	No connection. Reserved for <b>USB_DM</b> .
37	GND	P	Ground
38	NC	N/A	No connection. Reserved for <b>USB_DP</b> .
39	3V3	P	3.3V Power supply
40	GND	P	Ground
41	3V3	P	3.3V Power supply
42	NC	N/A	No connection
43	GND	P	Ground
44	NC	N/A	No connection
45	HOST_SCK	I/O	HOST SPI SCK
46	NC	N/A	No connection
47	HOST_MISO	I/O	HOST SPI MISO
48	NC	N/A	No connection
49	HOST_MOSI	I/O	HOST SPI MOSI





50	GND	P	Ground
51	HOST_CSN	I/O	HOST SPI CSN
52	3V3	P	3.3V Power supply

### 3. Specifications

#### 3.1 General specifications

Table 3.1: General specification

Parameters	Description
Modulation type	LoRa
LoRa Chipset	SX1303 + SX1250
Frequency	470~510MHz, 863~870MHz, 902~928MHz.
Max. TX Power	470~510MHz: 22dBm; Other: 27dBm.
Max. Receiving sensitivity	-139dBm
Multi-channel	Eight (8) uplink, one (1) downlink.
Host Interface	SPI(Default), USB.
Supply voltage	3.3V@500mA.
Operating temperature	-40~85°C
Dimensions	50.95*30*3mm
Packet	Tape & Reel Packaging

#### 3.2 Electrical characteristics

##### 3.2.1 Power supply

Table 3.2.1: Power supply



Power supply mode	Minimum	Typical	Maximum	Company
3V3 pin( $\geq 500\text{mA}$ )	2.7	3.3	3.5	V

### 3.2.2 Power characteristics

Table 3.2.2: Power characteristics

Mode	Condition	Min.	Typical	Max.	Company
TX	868MHz, 3.3V powered, 10dBm		135		mA
	868MHz, 3.3V powered, 14dBm		150		mA
	868MHz, 3.3V powered, 17dBm		200		mA
	868MHz, 3.3V powered, 27dBm		360	420	mA
RX	868MHz, 3.3V powered		40		mA

## 3.3 RF characteristics

### 3.3.1 Transmit power

Table 3.3.1: Transmit power

Operating frequency band	Maximum power value/[dBm]
470~510	21 $\pm$ 1
867~870	26 $\pm$ 1
902~928	26 $\pm$ 1

### 3.3.2 Receiving sensitivity

The following table gives typically sensitivity level of the HT-1303 concentrator module.

Table 3.3.2: Receiving sensitivity



Signal Bandwidth/[KHz]	Spreading Factor	Sensitivity/[dBm]
125	SF12	-139
125	SF10	-134
125	SF7	-125

### 3.4 Operation Frequencies

HT-1303 concentrator module supports the following LoRaWAN frequency channels, allowing easy configuration via config files without modify firmware from source code.

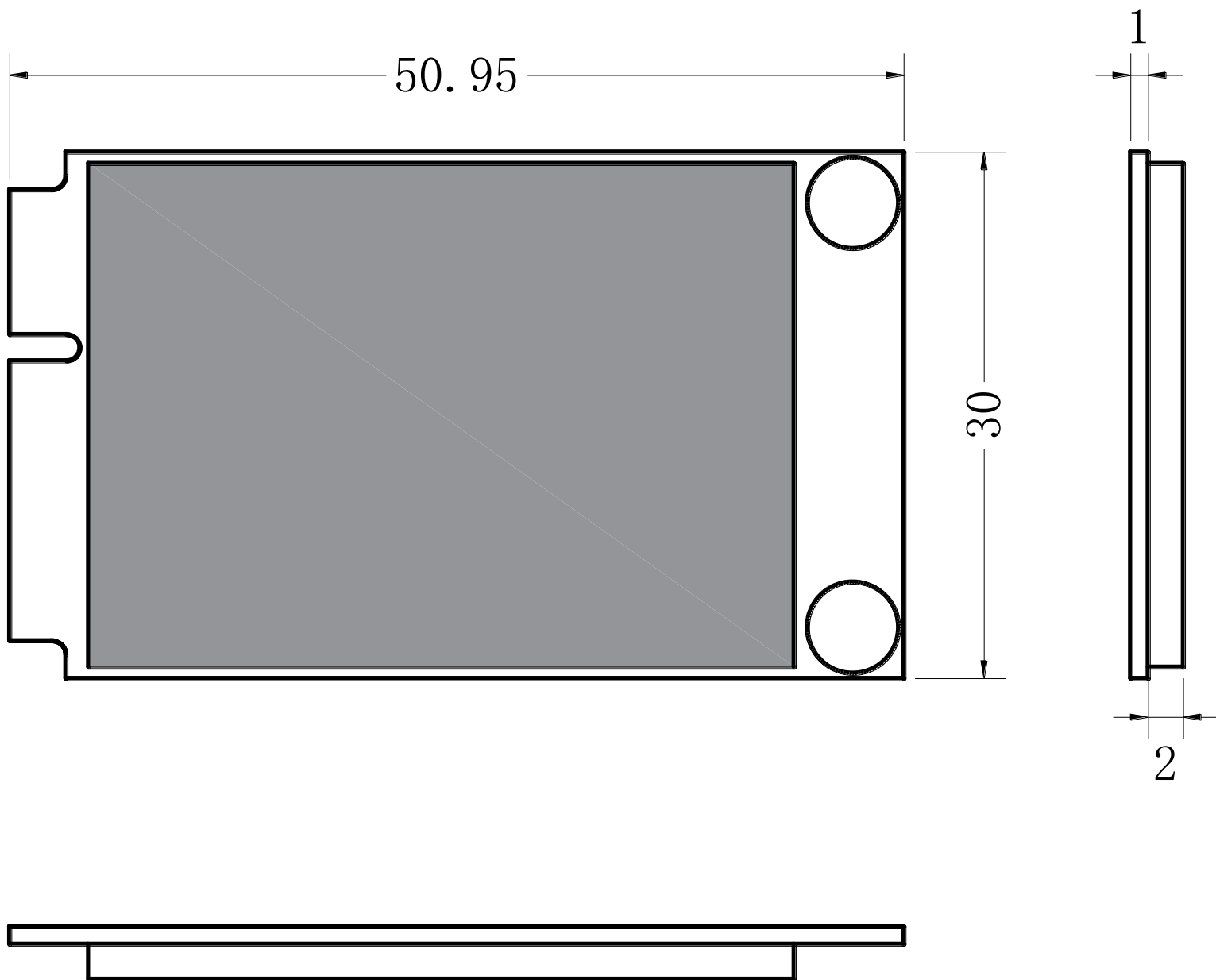
Table 3.4: Operation Frequencies

Region	Frequency (MHz)	Model
<b>EU433</b>	433.175~434.665	HT1303-SPI-470T510
		HT1303-USB-470T510
<b>CN470</b>	470~510	HT1303-SPI-470T510
		HT1303-USB-470T510
<b>IN868</b>	865~867	HT1303-SPI-863T870
		HT1303-USB-863T870
<b>EU868</b>	863~870	HT1303-SPI-863T870
		HT1303-USB-863T870
<b>US915</b>	902~928	HT1303-SPI-902T928
		HT1303-USB-902T928
<b>AU915</b>	915~928	HT1303-SPI-902T928
		HT1303-USB-902T928
<b>KR920</b>	920~923	HT1303-SPI-902T928
		HT1303-USB-902T928
<b>AS923</b>	920~925	HT1303-SPI-902T928
		HT1303-USB-902T928



## 4. Hardware resource

### 4.1 Physical dimensions





## 5. Resource

### 5.1 Relevant Resource

- [Recommend hardware design](#)
- [Pin map](#)
- [Downloadable resource](#)

### 5.2 Contact Information

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