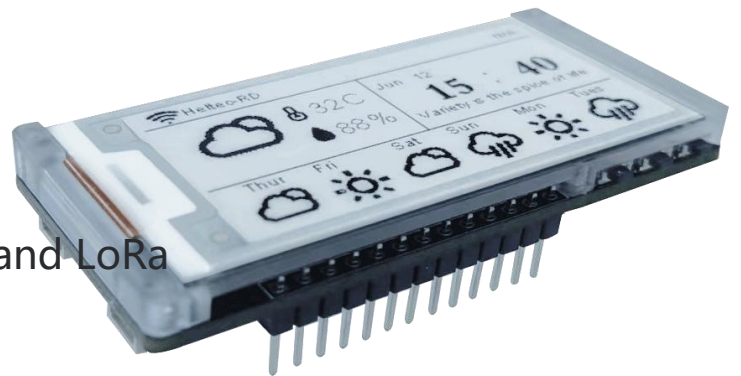




HT-VME213

2.13 E-ink Display with ESP32 and LoRa



Document version

Version	Time	Description	Remark
Rev. 1.0	2024-5-16	Preliminary version	Richard

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1 Description

1.1 Overview

Vision Master E213 (HT-VME213) is an E-Ink development kit with multiple wireless drive methods. Collaborate with the sample programs and development tools we provide, users can operate the display via Bluetooth, Wi-Fi and LoRa.

This board is equipped with a default 2.90-inch black and white E-Ink display screen, continuous display for 180 days after power outage. It can be used to develop applications such as electronic tags and identity tags, it is also possible to run open source projects like Meshtastic.

HT-VME213 are available in 3 product variants:

Table 1.1: Product model list

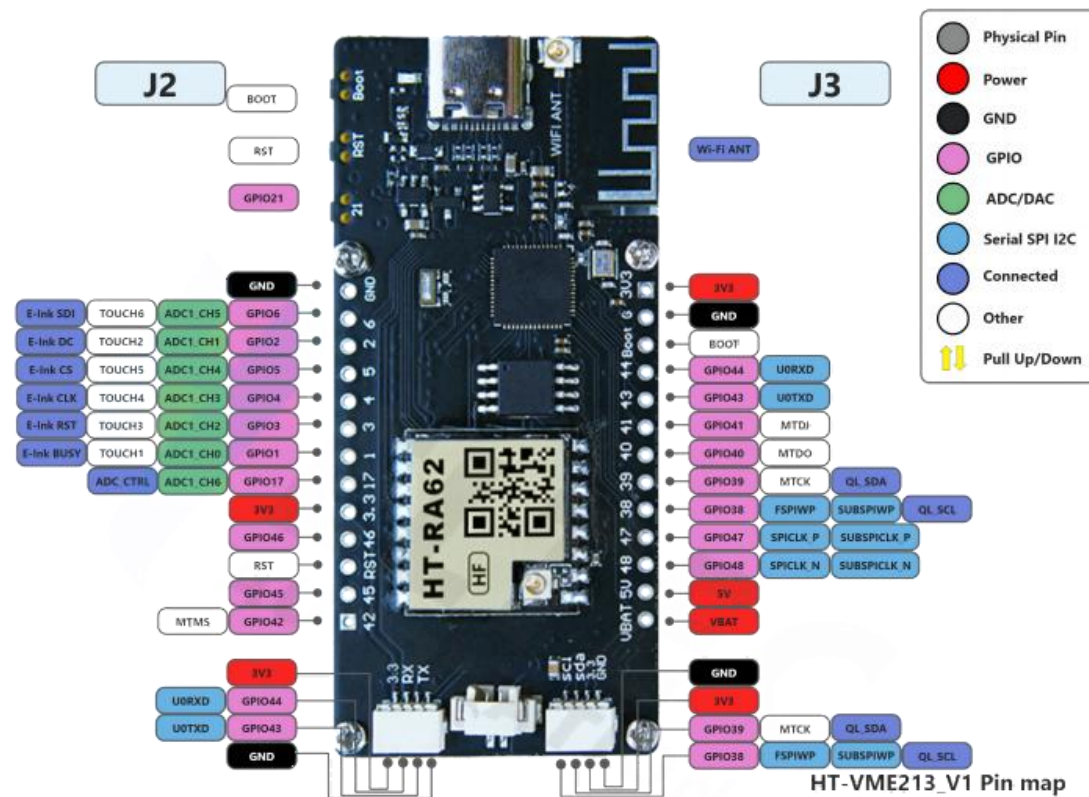
No.	Model	Description
1	HT-VME213	Without LoRa module
2	HT-VME213-LF	470~510MHz working LoRa frequency, used for China mainland (CN470) LPW band.
3	HT-VME213-HF	For EU868, IN865, US915, AU915, AS923, KR920 and other LPW networks with operating frequencies between 863~928MHz.



1.2 Product features

- ESP32-S3R8 MCU, support Wi-Fi and BLE.
- LoRa module is optional, compatible with Mashtastic.
- Low power consumption, 18uA in deep sleep, continuous display for 180 days after power outage.
- 250 x 122 pixels display, support for partial refresh.
- High contrast, high reflectance, ultra-wide viewing angle.
- Commercial temperature range: -25 ~ 70°C.
- 2*SH2.0-4P sensor interfaces is compatible with [QuickLink](#) series sensors.
- Compatible with Arduino, we provide [development frameworks and libraries](#).

2 Pin definition





Header J2

Name	Type	Description
GND	P	Ground.
6	I/O	GPIO6, ADC1_CH5, TOUCH6, EINK_SDI.
2	I/O	GPIO2, ADC1_CH1, TOUCH2, EINK_DC.
5	I/O	GPIO5, ADC1_CH4, TOUCH5, EINK_CS.
4	I/O	GPIO4, ADC1_CH3, TOUCH4, EINK_CLK.
3	I/O	GPIO3, ADC1_CH2, TOUCH3, EINK_RST.
1	I/O	GPIO1, ADC1_CH0, TOUCH1, EINK_BUSY.
17	I/O	GPIO17, ADC1_CH6, ADC_CTRL.
3.3	P	3V3 output.
46	I/O	GPIO46.
RST	P	RST.
45	I/O	GPIO45.
42	I/O	GPIO42, MTMS.

Header J3

Name	Type	Description
3V3	P	3V3 output.
GND	P	Ground.
BOOT	P	Boot.
44	I/O	GPIO44, U0RXD.
43	I/O	GPIO43, U0TXD.
41	I/O	GPIO41, MTDI.

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40	I/O	GPIO40, MTDO.
39	I/O	GPIO39, MTCK, QL_SDA ^① .
38	I/O	GPIO38, FSPIWP, SubSPIWP, QL_SCL ^② .
47	I/O	GPIO47, SPICK_P, SUBSPICK_P.
48	I/O	GPIO48, SPICK_N, SUBSPICK_N.
5V	P	5V Power Supply.
VBAT	P	Battery powered.

3 Specifications

3.1 General specification

Table 3.1: General specification

Parameters	Description
MCU	ESP32-S3R8
LoRa chipset	SX1262
Memory	384KB ROM; 512KB SRAM; 16KB RTC SRAM; 8MB SiP Flash
Wi-Fi	802.11 b/g/n
Bluetooth	Bluetooth LE: Bluetooth 5, Bluetooth mesh
E-Ink	LCMEN2R13EFC1
Display color	Black, White
Grayscale	2
Refresh time	2 Seconds

^① QL stands for QuickLink Sensor Interface.

^② QL stands for QuickLink Sensor Interface.



Storage temperature	-25~70℃
Operating temperature	0~50℃ (Optimal operating temperature of E-Ink)
Operating Humidity	0~65%(Optimal operating humidity of E-Ink)
Power Supply	3~5V (USB), 3~4.2(Battery)
Screen Size	2.13 Inch
Display Resolution	122(H)x250(V) Pixel
Active Area	23.7x48.6mm
Pixel Pitch	0.1942X0.1942mm
Pixel Configuration	Square
Hardware Resource	6*ADC_1, 1*ADC_2, 6*Touch, 8M*PSRAM, 3*UART; 2*I2C; 2*SPI. Etc.
Interface	Type-C USB, 2*1.25 lithium battery interface, LoRa ANT (IPEX1.0), Sensor connector(SH2.0-4P), 2*13*2.54 Header Pin
Dimensions	66.75*30.41*10mm

3.2 Power consumption

Table 2.2: Working current

Mode	Condition	Consumption(Battry@3.8V)
LoRa	5dBm	150mA
	10dBm	175mA
	15dBm	200mA
	20dBm	220mA
Wi-Fi	Scan	105mA
	AP	140mA

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BT		108mA
Sleep		18uA

3.3 LoRa RF characteristics

3.3.1 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.

Table3-5-2: Receiving sensitivity

Signal Bandwidth/[KHz]	Spreading Factor	Sensitivity/[dBm]
125	SF12	-135
125	SF10	-130
125	SF7	-124

3.5.3 Operation Frequencies

HT-VME213 supports LoRaWAN frequency channels and models corresponding table.

Table3-5-3: Operation Frequencies

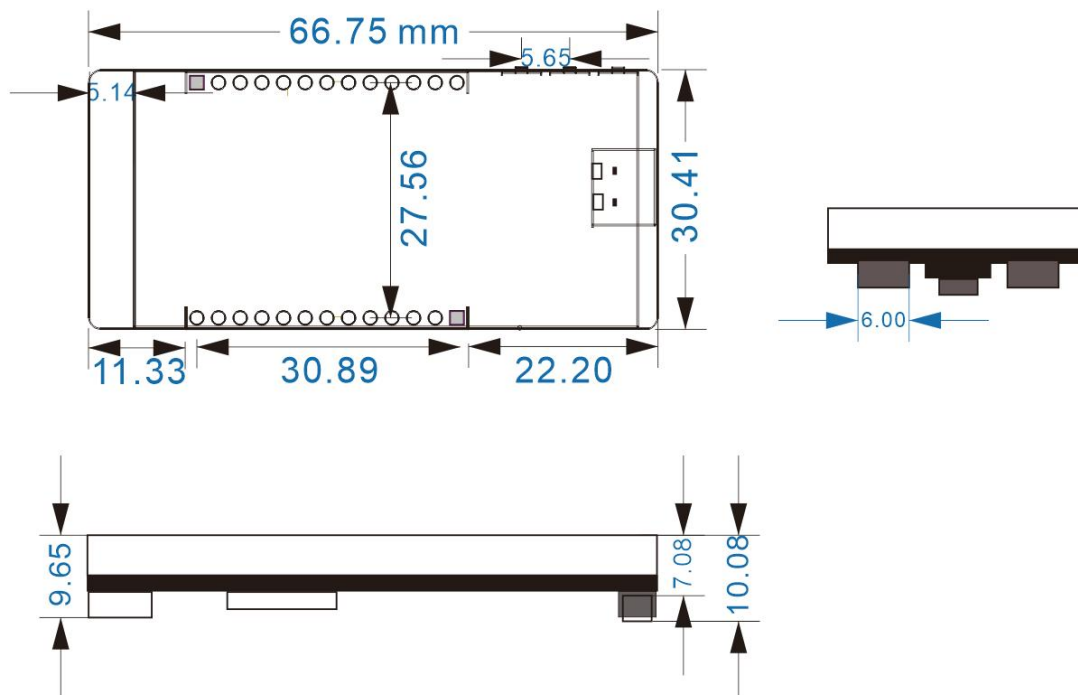
Region	Frequency (MHz)	Model
EU433	433.175~434.665	HT-VME213-LF

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CN470	470~510	HT-VME213r-LF
IN868	865~867	HT-VME213-HF
EU868	863~870	HT-VME213-HF
US915	902~928	HT-VME213-HF
AU915	915~928	HT-VME213-HF
KR920	920~923	HT-VME213-HF
AS923	920~925	HT-VME213-HF

4 Physical dimensions



5 Resource

5.1 Relevant resource

- [Heltec ESP32 framework and Lib.](#)
- [Heltec LoRaWAN test server based on TTS V3](#)
- [User Manual Document](#)

<https://heltec.org>



- [E-Ink Datasheet](#)

5.2 Heltec Contact Information

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