

User Manual
SKU: ABX00050

用户手册
SKU: ABX00050



Description

The Arduino Nicla Sense ME is our smallest form factor yet, with a range of industrial-grade sensors packed into a tiny footprint. Measure process parameters such as temperature, humidity, and movement. Dive into edge computing with powerful data fusion capabilities. Make your own industrial-grade wireless sensing network with the onboard BHI260AP, BMP390, BMM150, and BME688 sensors from Bosch®.

Target Areas

Wireless sensor networks, data fusion, artificial intelligence, and gas detection

Description

Arduino Nicla Sense ME 是我们目前最小的形态，将一系列工业级传感器集成在极小的空间内。测量温度、湿度、运动等工艺参数。借助强大的数据融合能力深入边缘计算。使用博世®的板载 BHI260AP、BMP390、BMM150 和 BME688 传感器，构建您自己的工业级无线传感网络。

Target Areas

无线传感网络、数据融合、人工智能和气体检测

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1 Features

1.1 Bluetooth® Module

Feature	Description
Model	ANNA-B112 Bluetooth® Module
Microcontroller	nRF52832 System-on-chip
CPU Core	64 MHz Arm® Cortex®-M4F
Internal SRAM Memory	64 KB
Internal Flash Memory	512 KB
External Flash Memory	2 MB
Interfaces	2x SPI, 2x I2C (one accessible via pin header each)
ADC	12-bit/200 ksps
Bluetooth® Frequency	2402–2480 MHz
Antenna	Internal
Oscillator	Internal 32 MHz
Operating Voltage	1.8 VDC

1.2 Smart Sensor with Integrated IMU

Feature	Description
Model	Bosch® BHI260AP
CPU Core	Fuser 2, 32 Bit Synopsys DesignWare ARC™ EM4™ CPU
IMU	6-axis: 16-bit 3-axis accelerometer & gyroscope
Advanced Features	Self-learning AI, swim analytics, pedestrian dead reckoning, orientation
External Memory	2MB Flash connected via QSPI

1.3 High-Performance Pressure Sensor

Feature	Description
Model	Bosch® BMP390
Operating Range	300–1250 hPa
Absolute Accuracy	± 0.5 hPa
Relative Accuracy	± 0.03 hPa (equivalent to ±25 cm)
RMS Noise	0.02 Pa
FIFO Buffer	Integrated 512 byte
Maximum Sampling Rate	200 Hz

1 Features

1.1 Bluetooth® Module

特性	描述
型号	ANNA-B112 蓝牙® 模块
微控制器	nRF52832 系统级芯片
CPU 核心	64 MHz Arm® Cortex®-M4F
内部 SRAM 内存	64 KB
内部 Flash 内存	512 KB
外部闪存	2 MB
接口	2x SPI, 2x I2C (每个可通过引脚排针访问)
ADC	12位/200 ksps
蓝牙® 频率	2402–2480 MHz
天线	内部
振荡器	内部 32 MHz
工作电压	1.8 VDC

1.2 Smart Sensor with Integrated IMU

特性	描述
型号	Bosch® BHI260AP
CPU 核心	Fuser 2, 32 位 Synopsys DesignWare ARCTM EM4TM CPU
IMU	6轴：16位3轴加速度计和陀螺仪
高级功能	自学习AI，游泳分析，行人推算，方向
外部存储	2MB闪存通过QSPI连接

1.3 High-Performance Pressure Sensor

功能	描述
型号	Bosch® BMP390
工作范围	300–1250 hPa
绝对精度	± 0.5 hPa
相对精度	± 0.03 hPa (相当于 ±25 cm)
RMS 噪声	0.02 Pa
FIFO 缓冲区	集成 512 字节
最大采样率	200 Hz

1.4 3-Axis Magnetometer

Feature	Description
Model	Bosch® BMM150
Magnetic Range	X, Y axis: $\pm 1300 \mu\text{T}$, Z axis: $\pm 2500 \mu\text{T}$
Resolution	0.3 μT
Non-linearity	<1% FS

1.5 Environmental Sensor

Feature	Description
Model	Bosch® BME688
Operating Range	Pressure: 300-1100 hPa, Humidity: 0-100%, Temperature: -40 - +85°C
eNose Sensor	Sensor-to-sensor deviation (IAQ): $\pm 15\% \pm 15$ IAQ
Sensor Outputs	IAQ, bVOC- and CO2-equivalents (ppm), gas scan result (%), intensity level

1.6 Onboard Microcontroller

Feature	Description
Model	ATSAMD11D14A-MUT
Functions	Serial to USB bridge, debugger interface

1.4 3-Axis Magnetometer

特性	描述
型号	Bosch® BMM150
磁力范围	X, Y轴: $\pm 1300 \mu\text{T}$, Z轴: $\pm 2500 \mu\text{T}$
分辨率	0.3 μT
非线性	<1% FS

1.5 Environmental Sensor

特征	描述
模型	Bosch® BME688
工作范围	压力: 300-1100 hPa, 湿度: 0-100%, 温度: -40 - +85°C
eNose 传感器	传感器间偏差 (IAQ) : $\pm 15\% \pm 15$ IAQ
传感器输出	室内空气质量 (IAQ), bVOC-和CO2当量 (ppm), 气体扫描结果 (%), 强度等级

1.6 Onboard Microcontroller

功能	描述
型号	ATSAMD11D14A-MUT
函数	串口转USB桥接器, 调试接口

2 The Board

2.1 Application Examples

The Arduino® Nicla Sense ME is your gateway to develop wireless networking solutions with rapid development and high robustness. Get real-time insight into the operational characteristics of your processes. Take advantage of the high-quality sensors and networking capabilities to evaluate novel WSN architectures. Ultra-low power consumption and integrated battery management allow for deployment in various capabilities. WebBLE allows for easy OTA updates of the firmware as well as remote monitoring.

- **Warehouse & Inventory Management:** The environmental sensor of the Arduino® Nicla Sense ME can detect the ripening state of fruits, vegetables and meat allowing for intelligent management of perishable assets alongside the Arduino Cloud.
- **Distributed Industrial Sensing:** Identify operating conditions within your machine, factory or greenhouse remotely and even in hard-to-access or hazardous areas. Detect natural gas, toxic gases or other hazardous fumes using the AI capabilities on the **Arduino® Nicla Sense ME**. Improve safety levels with remote analysis. Mesh capabilities allow for simple deployment of WSN with minimal infrastructure requirements.
- **Wireless Sensor Network Reference Design:** The Nicla form factor has been specifically developed at Arduino® as a standard for wireless sensor networks which can be adapted by partners to develop custom-designed industrial solutions. Get a head start by developing custom end-user solutions including Cloud-connected battery-powered IoT devices and autonomous robotics. Researchers and educators can use this platform to work on an industrially-recognized standard for wireless sensor research and development that can shorten the time from concept to market.

2.2 Accessories (Not Included)

- Single-cell Li-ion/Li-Po battery

2.3 Related Products

- ESLOV connector
- Arduino® Portenta H7 (SKU: ABX00042)

2 The Board

2.1 Application Examples

Arduino® Nicla Sense ME 是您开发无线网络解决方案的入口，具有快速开发和高度鲁棒性。实时洞察您流程的操作特性。利用高质量的传感器和网络功能来评估新型 WSN 架构。超低功耗和集成电池管理允许在各种能力中进行部署。WebBLE 允许轻松进行固件 OTA 更新以及远程监控。

- 仓库与库存管理：Arduino® Nicla Sense ME 的环境传感器可以检测水果、蔬菜和肉类的成熟状态，允许在 Arduino Cloud 旁边进行易腐烂资产的管理。
- 分布式工业传感：远程识别您的机器、工厂或温室内的操作条件，甚至在不易进入或危险区域。使用 Arduino® Nicla Sense ME 上的 AI 功能检测天然气、有毒气体或其他有害烟雾。通过远程分析提高安全水平。网状功能允许以最小的基础设施要求简单地部署 WSN。
- 无线传感器网络参考设计：Nicla 外形因素已在 Arduino® 特别开发为无线传感器网络的标准，合作伙伴可以将其调整以开发定制的工业解决方案。通过开发定制的端用户解决方案（包括云连接的电池供电 IoT 设备和自主机器人）来提前获得优势。研究人员和教育工作者可以使用此平台来研究工业认可的无线传感器研究和开发标准，以缩短从概念到市场的時間。

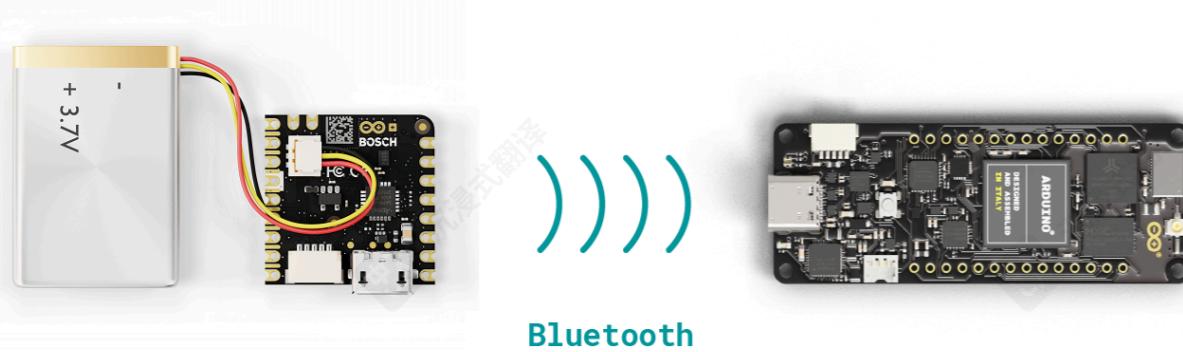
2.2 Accessories (Not Included)

- 单节锂离子/锂聚合物电池

2.3 Related Products

- ESLOV连接器
- Arduino® Portenta H7 (SKU: ABX00042)

2.4 Assembly Overview



Example of a typical solution for remote environmental sensing including an Arduino® Nicla Sense ME, Portenta H7 and battery. Notice the orientation of the battery's cable in the board's connector.

Note: The NTC pin on the battery connector is optional. This feature allows safer use and thermal shutoff.

3 Ratings

3.1 Recommended Operating Conditions

Symbol	Description	Min	Typ	Max	Unit
V_{IN}	Input voltage from VIN pad	3.5	5.0	5.5	V
V_{USB}	Input voltage from USB connector	4.8	5.0	5.5	V
V_{DDIO_EXT}	Level Translator Voltage	1.8	3.3	3.3	V
V_{IH}	Input high-level voltage	$0.7V_{DDIO_EXT}^1$		V_{DDIO_EXT}	V
V_{IL}	Input low-level voltage	0		$0.3V_{DDIO_EXT}^2$	V
T_{OP}	Operating Temperature	-40	25	85	°C

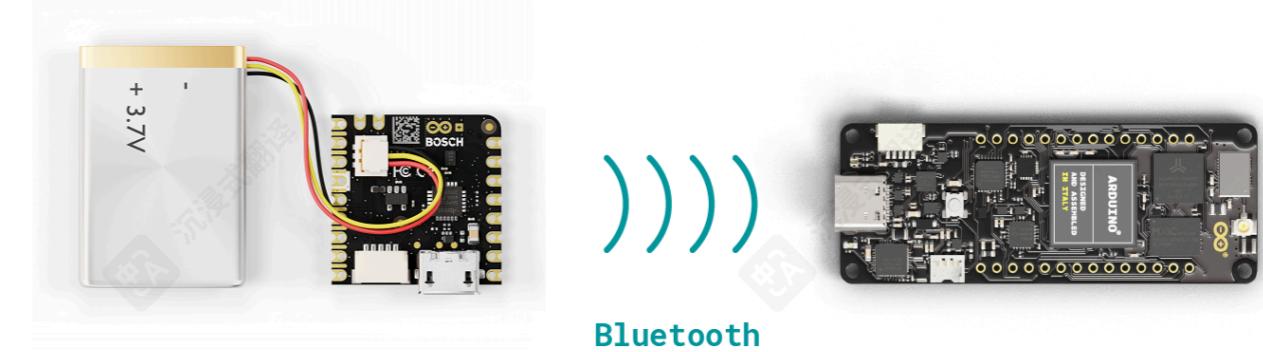
Note: V_{DDIO_EXT} is software programmable. While the ADC inputs can accept up to 3.3V, the maximum value is at the ANNA B112 operating voltage.

¹: All I/O pins operate at V_{DDIO_EXT} apart from the following:

- ADC1 and ADC2 - 1V8
- JTAG_SAMD11 - 3V3
- JTAG_ANNA - 1V8
- JTAG_BHI - 1V8

²: If the internal V_{DDIO_EXT} is disabled, it is possible to supply it externally.

2.4 Assembly Overview



一个典型的远程环境传感解决方案示例，包括Arduino® Nicla Sense ME、Portenta H7和电池。注意电池的线缆在主板连接器中的方向。

注意：电池连接器上的NTC引脚是可选的。此功能允许更安全的使用和过热断电。

3 Ratings

3.1 Recommended Operating Conditions

符号	描述	Min	Typ	Max	Unit
V_{IN}	来自VIN脚的输入电压	3.5	5.0	5.5	V
V_{USB}	来自USB连接器的输入电压	4.8	5.0	5.5	V
V_{DDIO_EXT}	电平转换电压	1.8	3.3	3.3	V
V_{IH}	输入高电平电压	$0.7V_{DDIO_EXT}^1$		V_{DDIO_EXT}	V
V_{IL}	输入低电平电压	0		$0.3V_{DDIO_EXT}^2$	V
T_{OP}	工作温度	-40	25	85	°C

注意：VDDIO EXT 是软件可编程的。虽然 ADC 输入可以接受高达 3.3V 的电压，但最大值在 ANNA B112 工作电压。

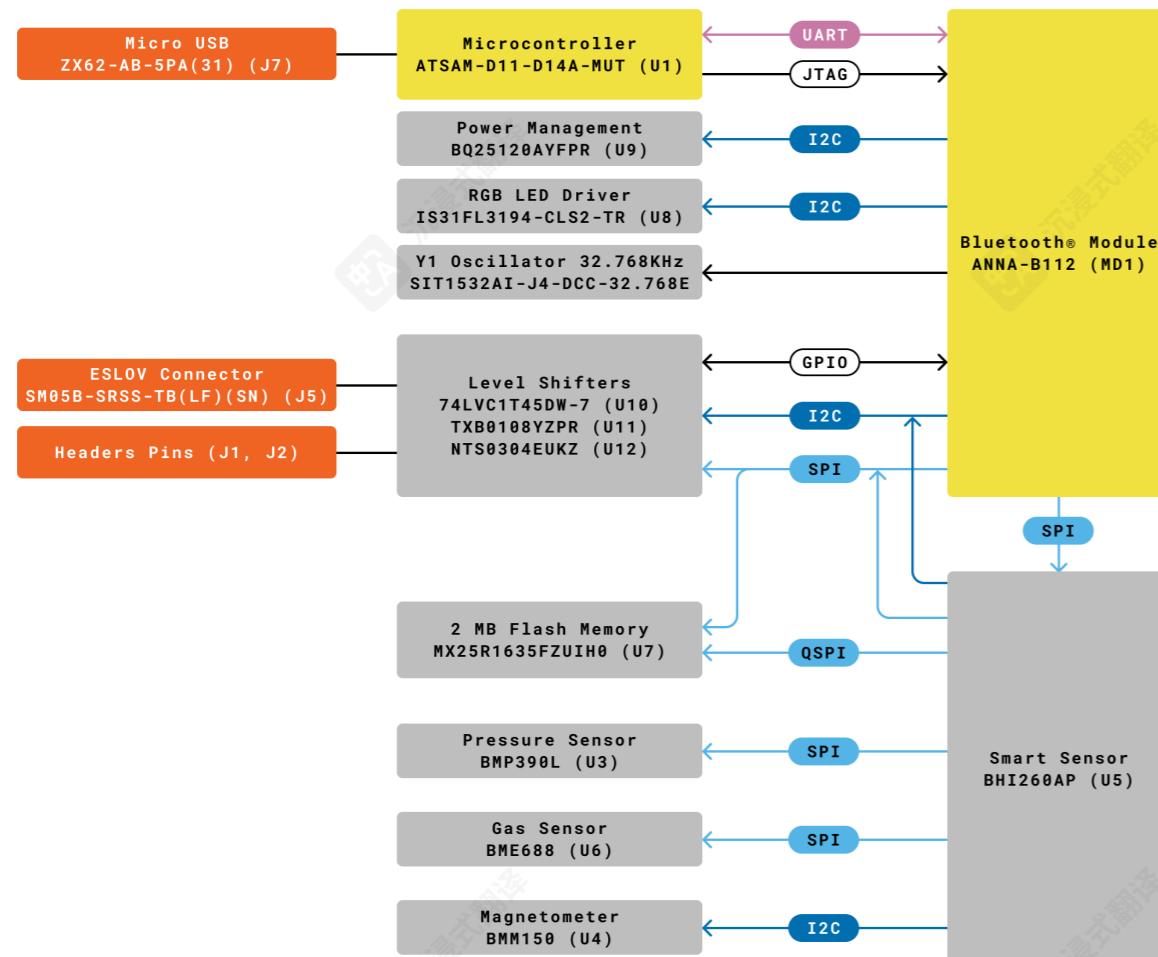
¹: 所有 I/O 引脚除以下列外均工作在 VDDIO EXT: _

- ADC1 和 ADC2 - 1V8
- JTAG_SAMD11 - 3V3
- JTAG_ANNA - 1V8
- JTAG_BHI - 1V8

²: 如果内部 VDDIO EXT 被禁用，则可以外部供电..

4 Functional Overview

4.1 Block Diagram

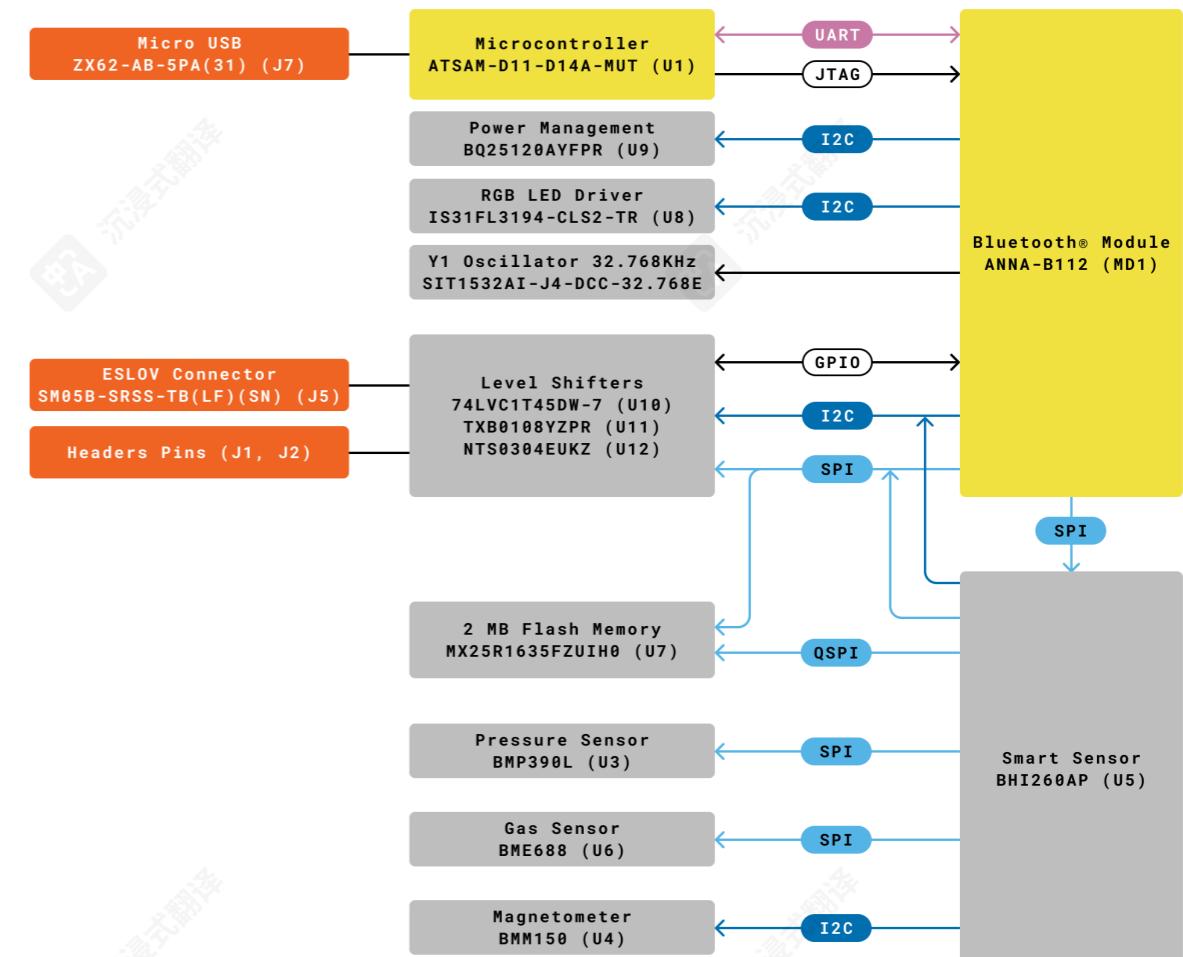


Legend:
█ Connector █ I2C/I2S █ Other
█ Main Part █ SPI
█ Internal Part █ UART/USART

Nicla Sense ME Block Diagram

4 Functional Overview

4.1 Block Diagram

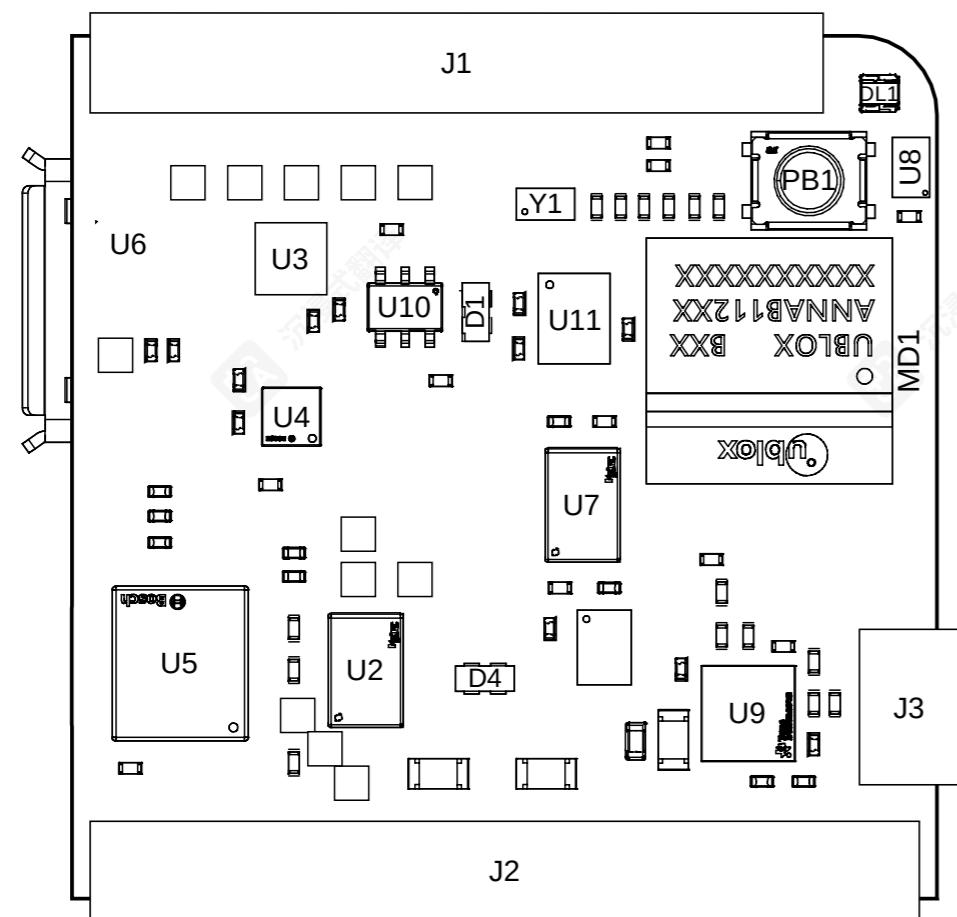


Legend:
█ Connector █ I2C/I2S █ Other
█ Main Part █ SPI
█ Internal Part █ UART/USART

Nicla Sense ME 块图

4.2 Board Topology

Top View

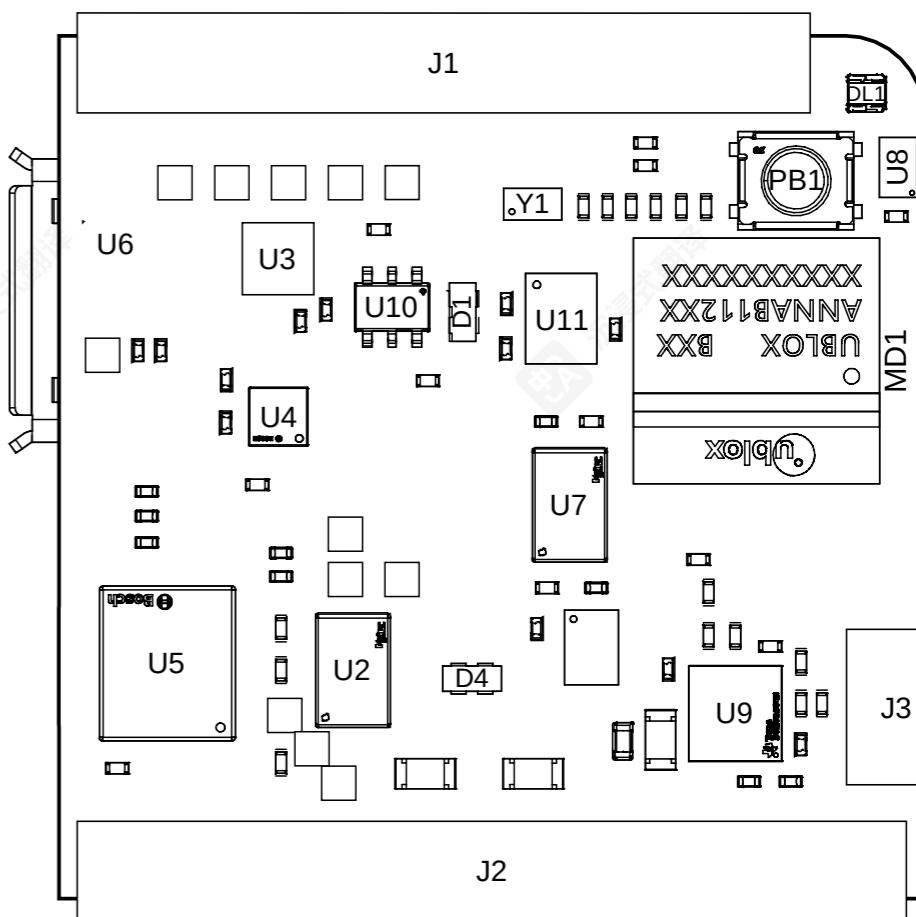


Nicla Sense ME Top View

Ref.	Description	Ref.	Description
MD1	ANNA B112 Bluetooth® Module	U2, U7	MX25R1635FZUIH0 2 MB FLASH IC
U3	BMP390 Pressure Sensor IC	U4	BMM150 3-axis Magnetic Sensor IC
U5	BHI260AP 6 axis IMU and AI core IC	U6	BME688 Environmental Sensor IC
U8	IS31FL3194-CLS2-TR 3-channel LED IC	U9	BQ25120AYFPR Battery Charger IC
U10	SN74LVC1T45 1Channel voltage level translator IC	U11	TXB0108YZPR Bidirectional IC
U12	NTS0304EUKZ 4-bit translating transceiver	J1	ADC, SPI and LPIO Pin headers
J2	I2C, JTAG, Power and LPIO pin headers	J3	Battery pin headers
Y1	SIT1532AI-J4-DCC MEMS 32.7680 kHz Oscillator	DL1	SMLP34RGB2W3 RGB SMD LED
PB1	Reset button		

4.2 Board Topology

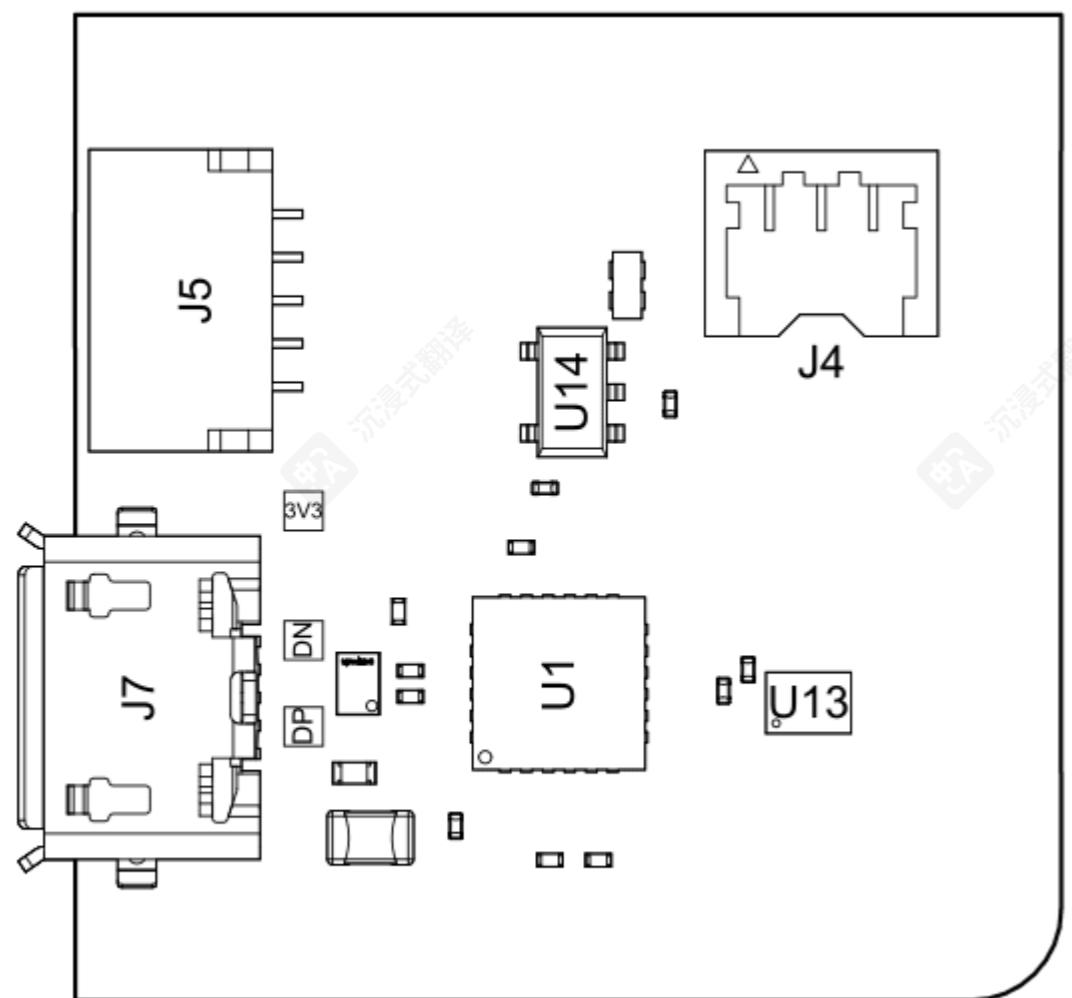
俯视图



Nicla Sense ME 俯视图

Ref.	描述	Ref.	描述
MD1	ANNA B112 蓝牙® 模块	U2, U7	MX25R1635FZUIH0 2 MB 闪存 IC
U3	BMP390 压力传感器 IC	U4	BMM150 三轴磁力传感器 IC
U5	BHI260AP 六轴 IMU 和 AI 核心 IC	U6	BME688 环境传感器 IC
U8	IS31FL3194-CLS2-TR 三通道 LED IC	U9	BQ25120AYFPR 电池充电 IC
U10	SN74LVC1T45 1Channel 电压电平转换 IC	U11	TXB0108YZPR 双向 IC
U12	NTS0304EUKZ 4位转换收发器	J1	ADC、SPI 和 LPIO 引脚排针
J2	I2C、JTAG、电源和 LPIO 引脚排针	J3	电池引脚排针
Y1	SIT1532AI-J4-DCC MEMS 32.7680 kHz 振荡器	DL1	SMLP34RGB2W3 RGB SMD LED
PB1	复位按钮		

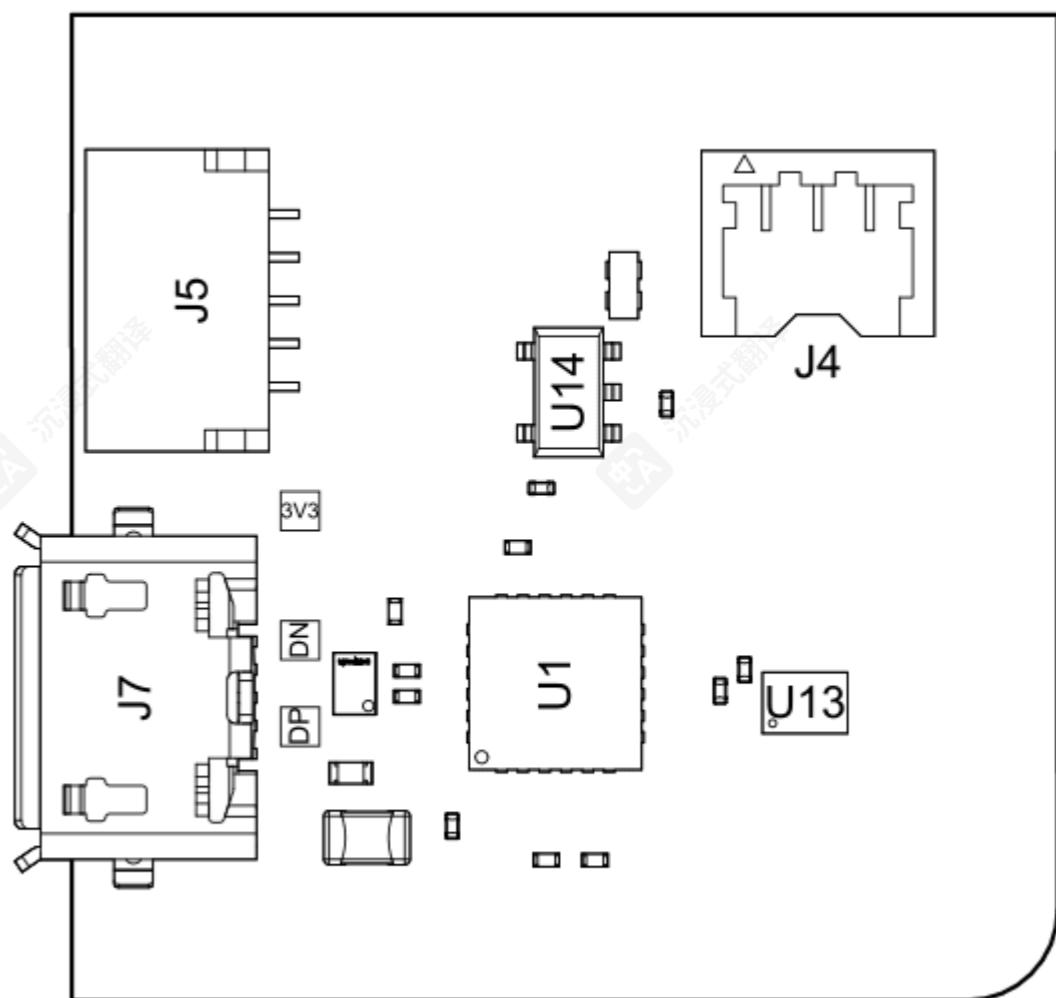
Back View



Nicla Sense ME Back View

Ref.	Description	Ref.	Description
U1	ATSAMD11D14A-MUT USB Bridge	U13	NTS0304EUKZ 4-bit translating transceiver IC
U14	AP2112K-3.3TRG1 0.6 A 3.3 V LDO IC	J4	3-pin 1.2mm ACH Battery Connector (BM03B-ACHSS-GAN-TF)
J5	SM05B-SRSS-TB(LF)(SN) 5-pin Eslov connector	J7	microUSB connector

后视图



Nicla Sense ME 后视图

Ref.	描述	Ref.	描述
U1	ATSAMD11D14A-MUT USB桥接器	U13	NTS0304EUKZ 4位翻译收发器IC
U14	AP2112K-3.3TRG1 0.6 A 3.3 V LDO 芯片	J4	3针1.2mm ACH电池连接器 (BM03B-ACHSS-GAN-TF)
J5	SM05B-SRSS-TB(LF)(SN) 5针Eslov connector	J7	microUSB connector

4.3 Microcontroller

The Arduino® Nicla Sense ME is powered by a nRF52832 SoC within the ANNA-B112 module (MD1). The nRF52832 SoC is built around an Arm® Cortex®-M4 microcontroller with a floating point unit running at 64 MHz. Sketches are stored inside the nRF52832 internal 512 KB FLASH which is shared with the bootloader. 64 KB SRAM is available to the user. The ANNA-B112 acts as an SPI host for the data logging 2MB flash (U7) and the BHI260 6-axis IMU (U5). It is also the secondary for the BHI260 (U5) I2C and SPI connection. While the module itself runs at 1.8V, a level shifter can adjust the logic level between 1.8V and 3.3V depending on the LDO set in BQ25120 (U9). An external oscillator (Y1) provides a 32 KHz signal.

4.4 Bosch® BHI260 Smart Sensor System with Built-in 6-Axis IMU

The Bosch® BHI260 is an ultra-low power programmable sensor, combining a Fuser2 core processor, 6-axis IMU (gyroscope and accelerometer) together with a sensor fusion software framework. The BHI260 is a smart sensor core (hosting a programmable recognition system), that handles communication with other sensors on the **Arduino Nicla Sense ME** via I2C and SPI connections. There is also a dedicated 2MB Flash (U2) used to store execute-in-place (XiP) code as well as data storage, such as Bosch® sensor fusion algorithm (BSX) calibration data. The BHI 260 is capable of loading custom algorithms that can be trained on a PC. The generated smart algorithm then operates on this chip.

4.5 Bosch® BME688 Environmental Sensor

The **Arduino Nicla Sense ME** is able to perform environmental monitoring via the Bosch® BME688 sensor (U6). This provides capabilities for pressure, humidity, temperature as well as Volatile Organic Compound (VOC) detection. The Bosch® BME688 performs gas detection via an eNose metal oxide semiconductor array with a typical gas scan cycle of 10.8 seconds.

4.6 Bosch® BMP390 Pressure Sensor

Industrial grade accuracy and stability in pressure measurements are provided by the BMP390 (U3) designed for prolonged use, with a relative accuracy of $\pm 0.03 \text{ hPa}$ and an RMS of 0.02 Pa in high-resolution mode. The Bosch® BMP390 is suitable for rapid measurements with a sampling rate of 200 Hz, or for low-power use with a sampling rate of 1 Hz, consuming less than 3.2 μA . U3 is controlled via an SPI interface to the BHI260 (U2), on the same bus as the BME688 (U6).

4.3 Microcontroller

Arduino® Nicla Sense ME 由 ANNA-B112 模块 (MD1) 内的 nRF52832 SoC 驱动。nRF52832 SoC 基于一个 Arm® Cortex®-M4 微控制器，该微控制器带有浮点单元，运行频率为 64 MHz。草图存储在 nRF52832 内部的 512 KB FLASH 中，该 FLASH 与引导加载程序共享。用户可使用 64 KB SRAM。ANNA-B112 作为 SPI 主机，用于数据记录 2MB 闪存 (U7) 和 BHI260 6 轴 IMU (U5)。它也是 BHI260 (U5) I2C 和 SPI 连接的从设备。虽然模块本身运行在 1.8V，但电平转换器可以在 1.8V 和 3.3V 之间调整逻辑电平，具体取决于 BQ25120 (U9) 中设置的 LDO。外部振荡器 (Y1) 提供 32 KHz 信号。

4.4 Bosch® BHI260 Smart Sensor System with Built-in 6-Axis IMU

博世® BHI260 是一款超低功耗可编程传感器，集成了一个 Fuser2 核心处理器、6轴 IMU（陀螺仪和加速度计）以及传感器融合软件框架。BHI260 是一个智能传感器核心（内置可编程识别系统），通过 I2C 和 SPI 连接处理与其他 Arduino Nicla Sense ME 上传感器的通信。还有一个专用的 2MB Flash (U2)，用于存储可原地执行 (XiP) 代码以及数据存储，例如博世®传感器融合算法 (BSX) 校准数据。BHI 260 能够加载可在 PC 上训练的自定义算法。生成的智能算法然后在此芯片上运行。

4.5 Bosch® BME688 Environmental Sensor

Arduino Nicla Sense ME 能够通过博世® BME688 传感器 (U6) 进行环境监测。这提供了压力、湿度、温度以及挥发性有机化合物 (VOC) 检测的功能。博世® BME688 通过一个典型气体扫描周期为 10.8 秒的金属氧化物半导体阵列 eNose 进行气体检测。

4.6 Bosch® BMP390 Pressure Sensor

工业级精度和稳定性在压力测量中由专为长期使用设计的 BMP390 (U3) 提供，相对精度为 $\pm 0.03 \text{ hPa}$ ，高分辨率模式下均方根值为 0.02 Pa。博世® BMP390 适用于以 200 Hz 的采样率进行快速测量，或以 1 Hz 的采样率进行低功耗使用，功耗小于 3.2 μA 。U3 通过 SPI 接口控制 BHI260 (U2)，与 BME688 (U6) 同在总线上。

4.7 Bosch® BMM150 3-Axis Magnetometer

The Bosch® BMM150 (U4) provides accurate 3-axis measurements of the magnetic field with compass-level accuracy. Combined with the BHI260 IMU (U2), Bosch® sensor fusion can be used to obtain high-accuracy spatial orientation and motion vectors for the detection of heading in autonomous robots as well as predictive maintenance. There is a dedicated I2C connection to the BHI260 (U2), acting as the host.

4.8 RGB LED

An I2C LED driver (U8) drives the RGB LED (DL1) and is capable of a maximum output of 40 mA. It is driven by the ANN-B112 (U5) microcontroller.

4.9 USB Bridge

The SAMD11 microcontroller (U1) is dedicated to act as both the USB bridge as well as the JTAG controller for the ANNA-B112. A logic level translator (U13) acts as an in-between to translate 3.3V logic to 1.8V for the ANNA-B112. The 3.3V voltage is generated from the USB voltage by an LDO (U14).

4.7 Bosch® BMM150 3-Axis Magnetometer

博世® BMM150 (U4) 提供精确的三轴磁场测量，具有指南针级精度。结合 BHI260 IMU (U2)，博世® 传感器融合可用于获取高精度空间定向和运动矢量，用于自主机器人航向检测以及预测性维护。有一个专用的 I2C 连接到 BHI260 (U2)，充当主机。

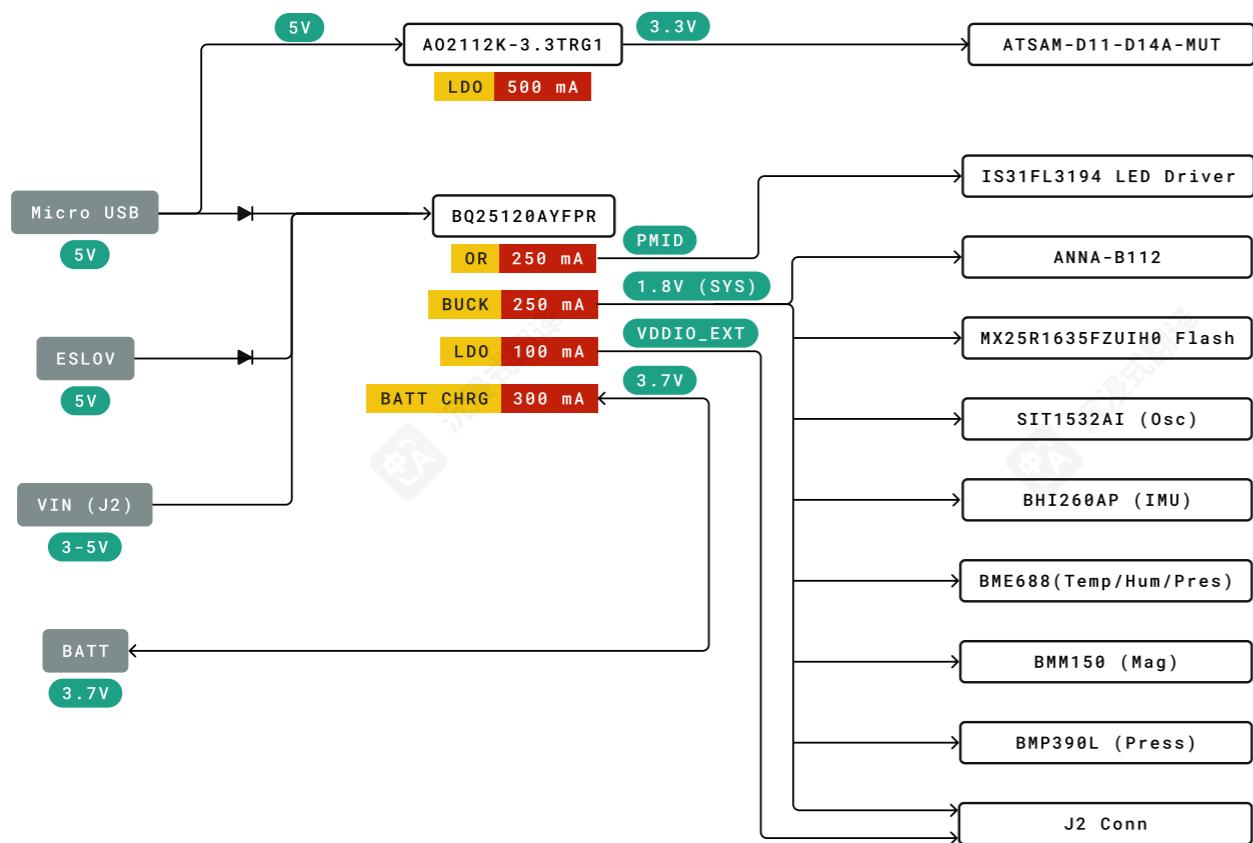
4.8 RGB LED

一个I2C LED驱动器 (U8) 驱动RGB LED (DL1) ，最大输出电流为40 mA。它由ANN-B112 (U5) 微控制器驱动。

4.9 USB Bridge

SAMD11 微控制器 (U1) 专门用作 USB 桥接器以及 ANNA-B112 的 JTAG 控制器。一个电平转换器 (U13) 作为中间设备，将 3.3V 逻辑电平转换为 ANNA-B112 使用的 1.8V。3.3V 电压由 LDO (U14) 从 USB 电压生成。

4.10 Power Tree

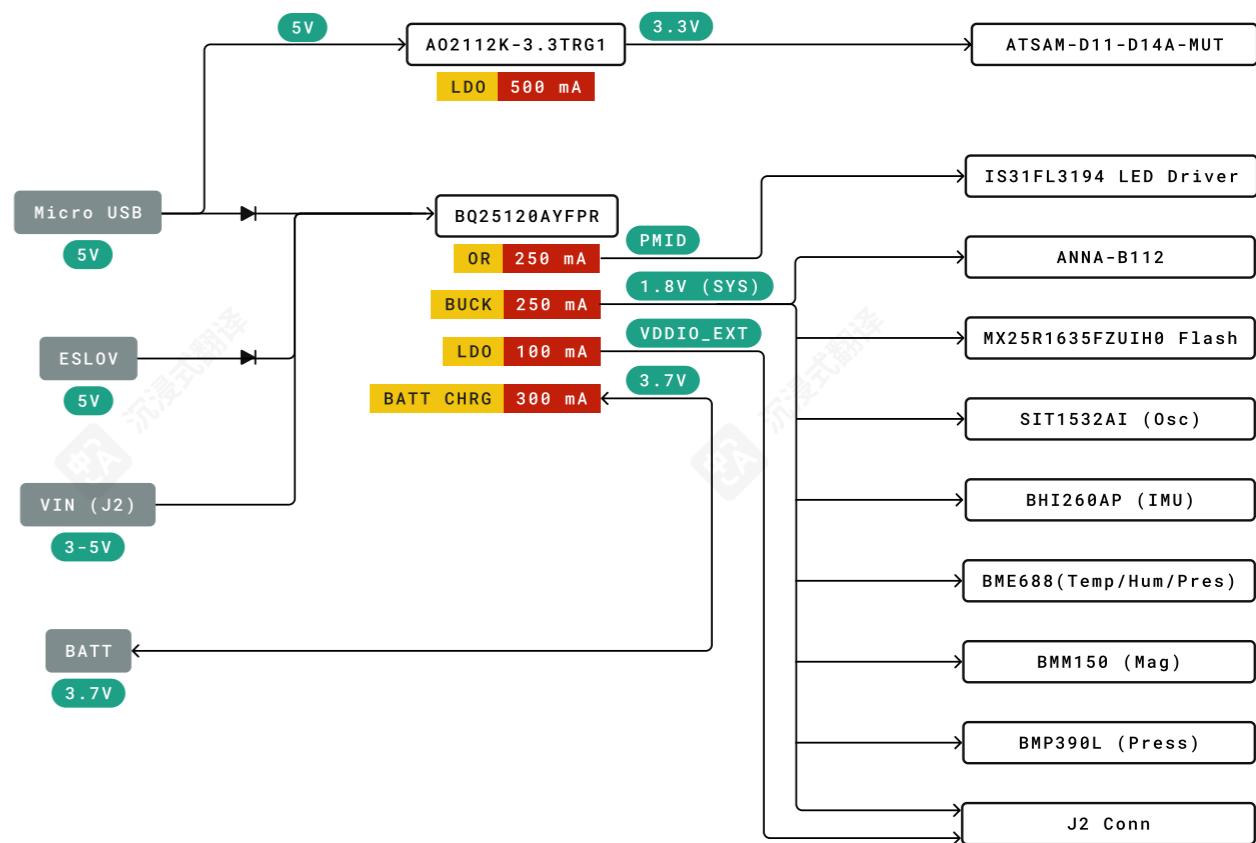


Nicla Sense ME Back View

The **Arduino Nicla Sense ME** can be powered via micro USB (J7), ESLOV (J5) or VIN. This is converted into the relevant voltages via the BQ2512BAYFPR IC (U9). A Schottky diode provides reverse polarity protection to the USB and ESLOV voltages. When voltage is supplied via the micro USB, a linear 3.3V regulator also provides power to the SAMD11 microcontroller used for programming the board as well as for JTAG and SWD. The LED driver (U8) and RGB LEDs (DL1) are driven by a boost voltage of 5V. All other components operate off the 1.8V rail regulated by a buck converter. PMID acts as an OR switch between VIN and BATT and operates the LED driver. All I/O broken out to the pins are fed through a bidirectional voltage translator running at V_{DDIO_EXT}.

Additionally, the BQ25120AYFPR (U9) also provides support for a single cell 3.7V LiPo/Li-ion battery pack connected to J4, allowing the use of the board as a wireless sensor network. The battery charging current is set to 40mA with a termination current of 4mA (10%).

4.10 Power Tree



Nicla Sense ME 后视图

Arduino Nicla Sense ME 可以通过 micro USB (J7)、ESLOV (J5) 或 VIN 供电。这通过 BQ2512BAYFPR 芯片 (U9) 转换为相关电压。一个肖特基二极管为 USB 和 ESLOV 电压提供反向极性保护。当通过 micro USB 供电时，一个线性 3.3V 稳压器也为用于编程板以及 JTAG 和 SWD 的 SAMD11 微控制器提供电源。LED 驱动器 (U8) 和 RGB LED (DL1) 由 5V 的升压电压驱动。所有其他组件都从由降压转换器调节的 1.8V 电源轨上运行。PMID 在 VIN 和 BATT 之间充当 OR 开关并驱动 LED 驱动器。所有引脚上引出的 I/O 都通过运行在 VDDIO_EXT_ 的双向电压转换器供电。

此外，BQ25120AYFPR (U9) 还支持连接到 J4 的单节 3.7V 锂聚合物/锂离子电池组，允许将板用作无线传感器网络。电池充电电流设置为 40mA，终止电流为 4mA (10%)。

5 Board Operation

5.1 Getting Started - IDE

If you want to program your Arduino® Nicla Sense ME while offline you need to install the Arduino® Desktop IDE [1] To connect the Arduino® Nicla Sense ME to your computer, you'll need a micro USB cable. This also provides power to the board, as indicated by the LED. The Arduino core is operated on the ANNA-B112 while the Bosch® Smart Sensor framework operates on the BHI260.

5.2 Getting Started - Arduino Cloud Editor

All Arduino® boards, including this one, work out-of-the-box on the Arduino® Cloud Editor [2], by just installing a simple plugin.

The Arduino® Cloud Editor is hosted online, therefore it will always be up-to-date with the latest features and support for all boards. Follow [3] to start coding on the browser and upload your sketches onto your board.

5.3 Getting Started - Arduino Cloud

All Arduino® IoT enabled products are supported on Arduino® Cloud which allows you to log, graph and analyze sensor data, trigger events, and automate your home or business.

5.4 Getting Started - WebBLE

The Arduino Nicla Sense ME provides the capability for OTA updates to the NINA-B112 and BHI260 firmware using WebBLE.

5.5 Getting Started - ESLOV

This board can act as a secondary to an ESLOV controller and have the firmware updated through this method.

5.6 Sample Sketches

Sample sketches for the Arduino® Nicla Sense ME can be found either in the "Examples" menu in the Arduino® IDE or in the "Documentation" section of the Arduino® Pro website [4]

5 Board Operation

5.1 Getting Started - IDE

如果您想离线编程 Arduino® Nicla Sense ME，您需要安装 Arduino® 桌面 IDE[1] 要将 Arduino® Nicla Sense ME 连接到您的计算机，您需要一根微 USB 线。这还为板供电，正如 LED 指示的那样。Arduino 核心在 ANNA-B112 上运行，而 Bosch® 智能传感器框架在 BHI260 上运行。

5.2 Getting Started - Arduino Cloud Editor

所有 Arduino® 板，包括这一款，只需安装一个简单的插件，即可在 Arduino® 云编辑器 [2]，上直接使用。

Arduino® 云编辑器托管在线上，因此它将始终与最新功能和所有板的支持保持同步。请遵循 [3] 开始在浏览器中编写代码，并将您的草图上传到您的板上。

5.3 Getting Started - Arduino Cloud

所有支持 Arduino® 物联网的产品都支持 Arduino® 云，这允许您记录、绘制和分析传感器数据，触发事件，并自动化您的家庭或业务。

5.4 Getting Started - WebBLE

Arduino Nicla Sense ME 提供了使用 WebBLE 对 NINA-B112 和 BHI260 固件进行 OTA 更新的功能。

5.5 Getting Started - ESLOV

这块板可以作为 ESLOV 控制器的一个从属设备，并通过此方法进行固件更新。

5.6 Sample Sketches

Arduino® Nicla Sense ME 的示例草图可以在 Arduino® IDE 的“示例”菜单中找到，也可以在 Arduino® Pro 网站的“文档”部分找到 [4]

5.7 Online Resources

Now that you have gone through the basics of what you can do with the board you can explore the endless possibilities it provides by checking exciting projects on ProjectHub [5], the Arduino® Library Reference [6] and the online store [7] where you will be able to complement your board with sensors, actuators and more.

5.8 Board Recovery

All Arduino® boards have a built-in bootloader that allows flashing the board via USB. In case a sketch locks up the processor and the board is not reachable anymore via USB, it is possible to enter bootloader mode by double-tapping the reset button right after the power-up.

6 Connector Pinouts

Note: All the pins on J1 and J2 (excluding fins) are referenced to the V_{DIO_EXT} voltage which can be generated internally or supplied externally.

6.1 J1 Nicla Header A

Pin	Function	Type	Description
1	LPIO0_EXT	Digital	Low Power IO Pin 0
2	NC	N/A	N/A
3	CS	Digital	SPI Cable Select
4	COPI	Digital	SPI Controller Out / Peripheral In
5	CIPO	Digital	SPI Controller In / Peripheral Out
6	SCLK	Digital	SPI Clock
7	ADC2	Analog	Analog Input 2
8	ADC1	Analog	Analog Input 1

6.2 J2 Nicla Header B

Pin	Function	Type	Description
1	SDA	Digital	I2C Data Line
2	SCL	Digital	I2C Clock
3	LPIO1_EXT	Digital	Low Power IO Pin 1
4	LPIO2_EXT	Digital	Low Power IO Pin 2
5	LPIO3_EXT	Digital	Low Power IO Pin 3
6	GND	Power	Ground
7	VDDIO_EXT	Digital	Logic Level Reference
8	N/C	N/A	N/A
9	VIN	Digital	Input Voltage

Note: For further information on how Low Power I/Os work, check Nicla Family Form Factor documentation.

5.7 Online Resources

现在你已经了解了该板的基本功能，你可以通过查看 ProjectHub [5], Arduino® 库参考 [6] 和在线商店 [7] 来探索它提供的无限可能，在那里你将能够用传感器、执行器等来补充你的板。

5.8 Board Recovery

所有 Arduino® 开发板都内置了引导加载程序，允许通过 USB 闪存。如果程序使处理器卡死且开发板无法再通过 USB 访问，可以通过上电后立即双击复位按钮进入引导加载程序模式。

6 Connector Pinouts

注意：J1和J2上的所有引脚（不包括散热片）都参考VDDIO EXT电压，该电压可以内部生成或外部供电。

6.1 J1 Nicla Header A

Pin	功能	Type	描述
1	LPIO0 EXT-	数字	低功耗 IO 引脚 0
2	NC	N/A	N/A
3	CS	数字	SPI 电缆选择
4	COPI	数字	SPI 控制器输出 / 外设输入
5	CIPO	数字	SPI 控制器输入 / 外设输出
6	SCLK	数字	SPI 时钟
7	ADC2	模拟	模拟输入 2
8	ADC1	模拟	模拟输入 1

6.2 J2 Nicla Header B

Pin	函数	Type	描述
1	SDA	数字	I2C 数据线
2	SCL	数字	I2C 时钟
3	LPIO1 EXT-	数字	低功耗IO引脚1
4	LPIO2 EXT-	数字	低功耗IO引脚2
5	LPIO3 EXT-	数字	低功耗IO引脚3
6	GND	电源	接地
7	VDDIO EXT-	数字	逻辑电平参考
8	N/C	N/A	N/A
9	VIN	数字	输入电压

注意：有关低功耗I/O的工作原理的更多信息，请查阅Nicla系列外形规格文档。

6.3 J2 Fins

Pin	Function	Type	Description
P1	BHI_SWDIO	Digital	BHI260 JTAG Serial Wire Debug Data
P2	BHI_SWDCLK	Digital	BHI260 JTAG Serial Wire Debug Clock
P3	ANNA_SWDIO	Digital	ANNA JTAG Serial Wire Debug Data
P4	ANNA_SWDCLK	Digital	ANNA JTAG Serial Wire Debug Clock
P5	RESET	Digital	Reset Pin
P6	SAMD11_SWDIO	Digital	SAMD11 JTAG Serial Wire Debug Data
P7	+1V8	Power	+1.8V Voltage Rail
P8	SAMD11_SWDCLK	Digital	SAMD11 JTAG Serial Wire Debug Clock

Note: These test points can easily be accessed by inserting the board in a double row 1.27 mm/50 mil pitch male header. **Note 2:** All JTAG logic levels operate at 1.8V apart from the SAMD11 pins (P6 and P8) which are 3.3V. All these JTAG pins are 1.8V only and don't scale with VDDIO.

6.4 J3 Battery Pads

Pin	Function	Type	Description
1	VBAT	Power	Battery input
2	NTC	Analog	NTC Thermistor

6.5 J4 Battery Connector

Pin	Function	Type	Description
1	VBAT	Power	Battery input
2	NTC	Analog	NTC Thermistor
3	GND	Power	Ground

6.6 J5 ESL0V

Pin	Function	Type	Description
1	5V	Power	5V Power Rail
2	INT	Digital	Digital IO
3	SCL	Digital	I2C Clock Line
4	SDA	Digital	I2C Data Line
5	GND	Power	Ground

6.3 J2 Fins

Pin	功能	Type	描述
P1	BHI SWDIO_	数字	BHI260 JTAG 串行调试数据
P2	BHI SWDCLK_	数字	BHI260 JTAG 串行线调试时钟
P3	ANNA SWDIO_	数字	ANNA JTAG 串行线调试数据
P4	ANNA_SWDCLK_	数字	ANNA JTAG 串行线调试时钟
P5	复位	数字	复位引脚
P6	SAMD11 SWDIO_	数字	SAMD11 JTAG 串行线调试数据
P7	+1V8	电源	+1.8V 电压轨
P8	SAMD11_SWDCLK_	数字	SAMD11 JTAG 串行线调试时钟

注意：通过将电路板插入双列1.27 mm/50 mil间距的公头，可以轻松访问这些测试点。注意2：所有JTAG逻辑电平在1.8V，除了SAMD11引脚（P6和P8）为3.3V。所有这些JTAG引脚都是1.8V，不随VDDIO变化。

6.4 J3 Battery Pads

Pin	功能	Type	描述
1	VBAT	电源	电池输入
2	NTC	模拟	NTC 温度计

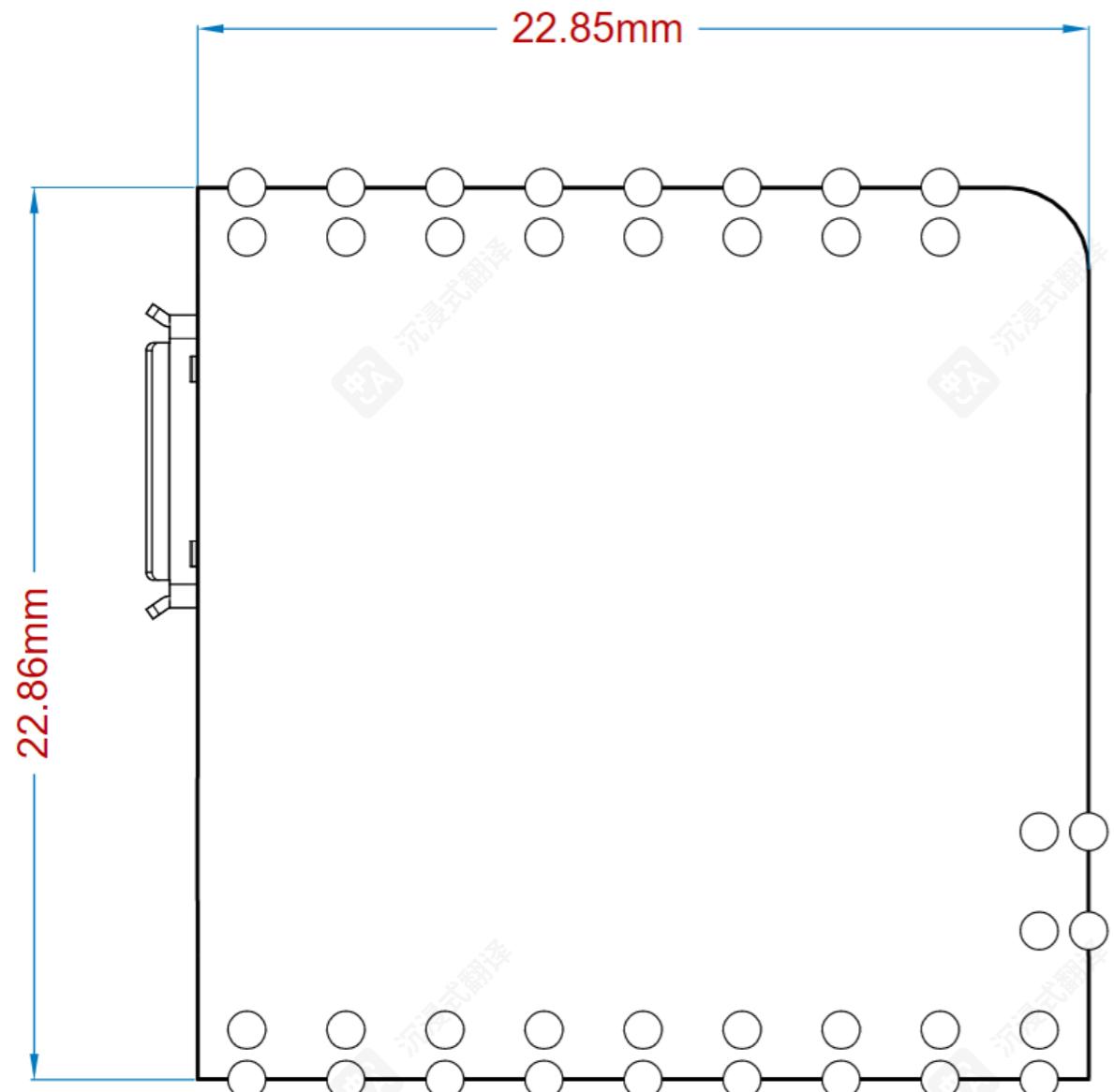
6.5 J4 Battery Connector

Pin	功能	Type	描述
1	VBAT	功率	电池输入
2	NTC	模拟	NTC 温度计
3	GND	电源	接地

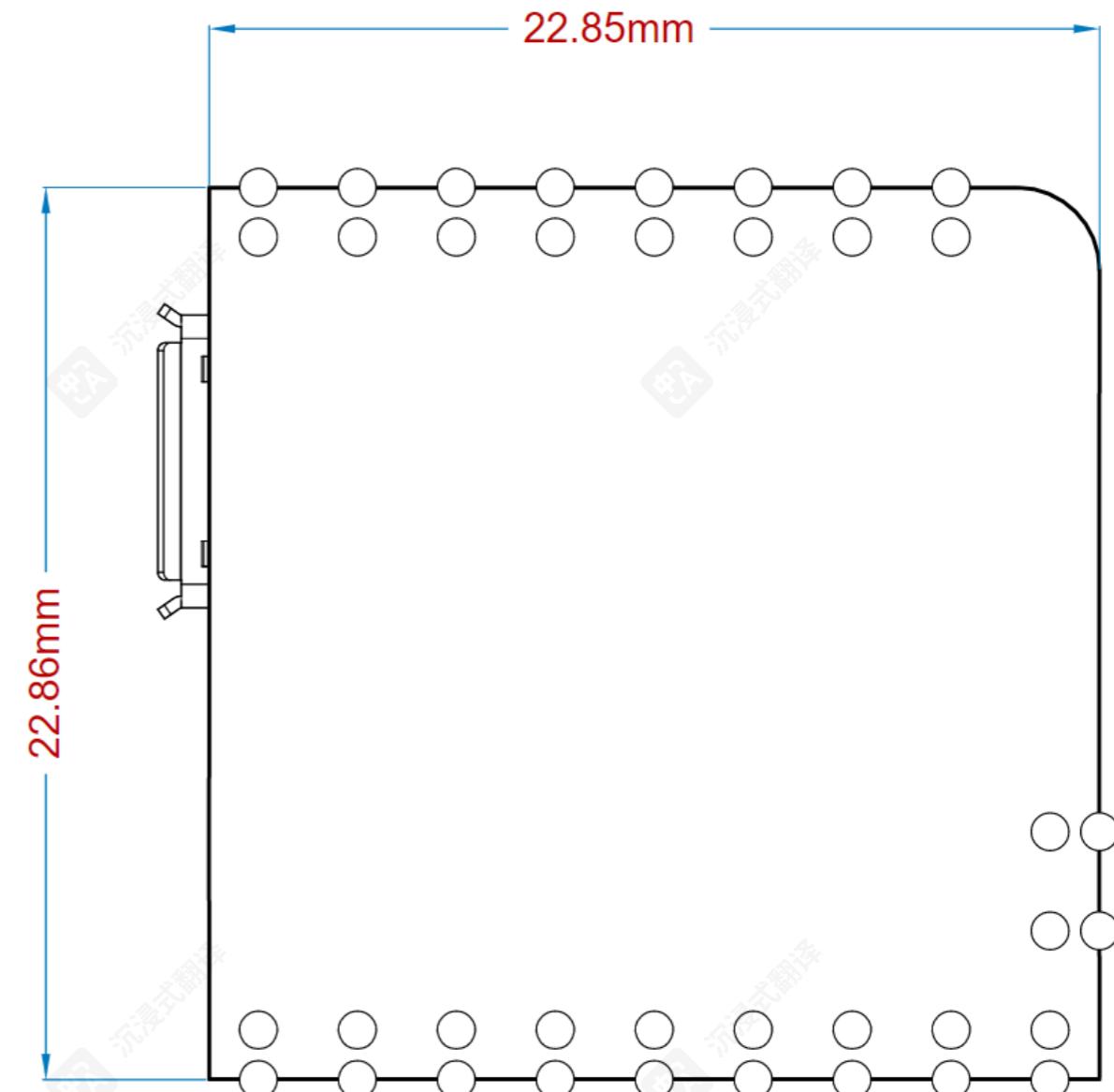
6.6 J5 ESL0V

Pin	功能	Type	描述
1	5V	电源	5V 电源轨
2	INT	数字	数字 IO
3	SCL	数字	I2C 时钟线
4	SDA	数字	I2C 数据线
5	GND	电源	接地

7 Mechanical Information



7 Mechanical Information



7.1 Power Consumption

Description	Min	Typ	Max	Unit
Power consumption in standby		460		uA
Power consumption with blink sketch		960		uA
Power consumption advertising with sensor polling at 1Hz		2.5		mA
Power consumption advertising with sensor polling once per hour		1.15		mA

Note: The measurements have been performed by activating the temperature sensor, accelerometer and gyroscope, which have been configured with a 1Hz sample rate and 1ms latency.

8 Certifications

8.1 Certifications Summary

Certification	Status
CE (EU)	EN IEC 62311:2020 EN 62368-1:2014+A11+2017 ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.4 (2020-09) ETSI EN 300 328 V2.2.2: 2019-07
RoHS (EU)	IEC 62321-3-1-2013 IEC 62321-5-2013 IEC 62321-7-1-2015 IEC 62321-7-2-2017 IEC 62321-6-2015 IEC 62321-8-2017
REACH (EU)	Yes
WEEE (EU)	Yes
UKCA (UK)	EN IEC 62311:2020 EN 62368-1-2014+A11+2017 ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.4 (2020-09) ETSI EN 300 328 V2.2.2: 2019-07
FCC (US)	Yes
IC (CA)	RSS-247 Issue 2

7.1 Power Consumption

描述	Min	Typ	Max	Unit
待机功耗	460			uA
闪烁草图功耗	960			uA
传感器以1Hz频率轮询时的广告功耗	2.5			mA
传感器每小时轮询一次时的广告功耗	1.15			mA

注意：测量是通过激活温度传感器、加速度计和陀螺仪进行的，这些设备已配置为1Hz采样率和1ms延迟。

8 Certifications

8.1 Certifications Summary

认证	状态
CE (EU)	EN IEC 62311:2020 EN 62368-1:2014+A11+2017 ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.4 (2020-09) ETSI EN 300 328 V2.2.2: 2019-07
RoHS (EU)	IEC 62321-3-1-2013 EC 62321-5-2013 IEC 62321-7-1-2015 EC 62321-7-2-2017 IEC 62321-6-2015 IEC 62321-8-2017
REACH (EU)	Yes
WEEE (EU)	Yes
UKCA (UK)	EN IEC 62311:2020 EN 62368-1-2014+A11+2017 ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI E N 301 489-17 V3.2.4 (2020-09) ETSI EN 300 328 V2.2.2: 2019-07
FCC (US)	Yes
IC (CA)	RSS-247 Issue 2

Certification	Status
MIC	Yes
SRRC	Yes
CCC	Yes
GB4943	Yes

8.2 Declaration of Conformity CE DoC (EU)

We declare under our sole responsibility that the products above are in conformity with the essential requirements of the following EU Directives and therefore qualify for free movement within markets comprising the European Union (EU) and European Economic Area (EEA).

8.3 Declaration of Conformity to EU RoHS & REACH 211 01/19/2021

Arduino boards are in compliance with RoHS 2 Directive 2011/65/EU of the European Parliament and RoHS 3 Directive 2015/863/EU of the Council of 4 June 2015 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Substance	Maximum limit (ppm)
Lead (Pb)	1000
Cadmium (Cd)	100
Mercury (Hg)	1000
Hexavalent Chromium (Cr6+)	1000
Poly Brominated Biphenyls (PBB)	1000
Poly Brominated Diphenyl ethers (PBDE)	1000
Bis(2-Ethylhexyl) phthalate (DEHP)	1000
Benzyl butyl phthalate (BBP)	1000
Dibutyl phthalate (DBP)	1000
Diisobutyl phthalate (DIBP)	1000

Exemptions: No exemptions are claimed.

Arduino Boards are fully compliant with the related requirements of European Union Regulation (EC) 1907 /2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH). We declare none of the SVHCs (<https://echa.europa.eu/web/guest/candidate-list-table>), the Candidate List of Substances of Very High Concern for authorization currently released by ECHA, is present in all products (and also package) in quantities totaling in a concentration equal or above 0.1%. To the best of our knowledge, we also declare that our products do not contain any of the substances listed on the "Authorization List" (Annex XIV of the REACH regulations) and Substances of Very High Concern (SVHC) in any significant amounts as specified by the Annex XVII of Candidate list published by ECHA (European Chemical Agency) 1907 /2006/EC.

认证	状态
MIC	Yes
SRRC	Yes
CCC	Yes
GB4943	Yes

8.2 Declaration of Conformity CE DoC (EU)

我们仅以我们自己的责任声明，上述产品符合以下欧盟指令的基本要求，因此有资格在构成欧洲联盟（EU）和欧洲经济区（EEA）的市场内自由流通。

8.3 Declaration of Conformity to EU RoHS & REACH 211 01/19/2021

Arduino 板符合欧洲议会 RoHS 2 指令 2011/65/EU 以及 2015 年 6 月 4 日理事会关于在电气和电子设备中限制某些有害物质使用的 RoHS 3 指令 2015/863/EU。

物质	最大限值 (ppm)
铅 (Pb)	1000
镉 (Cd)	100
汞 (Hg)	1000
六价铬 (Cr6+)	1000
多溴联苯 (PBB)	1000
多溴联苯醚 (PBDE)	1000
邻苯二甲酸二(2-乙基己基)酯 (DEHP)	1000
邻苯二甲酸苄基丁基酯 (BBP)	1000
邻苯二甲酸丁基酯 (DBP)	1000
邻苯二甲酸二异丁基酯 (DIBP)	1000

豁免：未声明豁免。

Arduino Boards 完全符合欧盟法规 (EC) 1907 /2006 关于化学品注册、评估、授权和限制 (REACH) 的相关要求。我们声明，目前 ECHA 发布的《授权候选物质清单》(SVHCs, <https://echa.europa.eu/web/guest/candidate-list-table>) 中，没有任何物质存在于所有产品（包括包装）中，且其总量浓度等于或高于 0.1%。据我们所知，我们的产品也不包含《授权清单》(REACH 法规附件 XIV) 中列出的任何物质以及 ECHA (欧洲化学品管理局) 发布的 1907 /2006/EC 法规附件 XVII 中规定的 SVHC 物质，且这些物质均未以显著数量存在。

8.4 Conflict Minerals Declaration

As a global supplier of electronic and electrical components, Arduino is aware of our obligations with regards to laws and regulations regarding Conflict Minerals, specifically the Dodd-Frank Wall Street Reform and Consumer Protection Act, Section 1502. Arduino does not directly source or process conflict minerals such as Tin, Tantalum, Tungsten, or Gold. Conflict minerals are contained in our products in the form of solder, or as a component in metal alloys. As part of our reasonable due diligence Arduino has contacted component suppliers within our supply chain to verify their continued compliance with the regulations. Based on the information received thus far we declare that our products contain Conflict Minerals sourced from conflict-free areas.

9 FCC Caution

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference
- (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC RF Radiation Exposure Statement:

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment.
3. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body.

English: User manuals for license-exempt radio apparatus shall contain the following or equivalent notice in a conspicuous location in the user manual or alternatively on the device or both. This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) this device may not cause interference
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.

French: Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil n'edoit pas produire de brouillage
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IC SAR Warning:

English This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

8.4 Conflict Minerals Declaration

作为电子和电气元件的全球供应商，Arduino 了解我们在冲突矿产相关法律和法规方面的义务，特别是《多德-弗兰克华尔街改革和消费者保护法案》第 1502 节。Arduino 不直接采购或加工锡、钽、钨或黄金等冲突矿产。冲突矿产以焊料的形态存在于我们的产品中，或作为金属合金的成分。作为合理尽职调查的一部分，Arduino 已联系供应链中的组件供应商，以验证其持续符合相关法规。根据我们目前收到的信息，我们声明我们的产品中含有的冲突矿产来自无冲突地区。

9 FCC Caution

任何变更或修改未经合规责任方明确批准，可能会使用户丧失操作设备的权利。

本设备符合FCC规则第15部分。操作受以下两个条件约束：

- (1) 本设备不得造成有害干扰
- (2) 本设备必须接受任何接收到的干扰，包括可能导致非预期操作的干扰。

FCC射频辐射暴露声明：

1. 本发射器不得与任何其他天线或发射器共址或联合运行。
2. 该设备符合非受控环境中所规定的射频辐射暴露限值。
3. 该设备应安装和操作，辐射体与
你的身体。

使用许可豁免无线电设备的使用手册应包含以下或同等内容的声明：

4. 该设备符合加拿大工业部豁免射频标准。操作需满足以下两个条件：

- (1) 本设备不得造成干扰
- (2) 该设备必须接受任何干扰，包括可能导致非预期运行的干扰
设备。

本设备符合加拿大工业部适用于免除外壳无线电设备的相关CNR规定。
许可证。运营需满足以下两个条件：

- (1) 设备不应产生干扰
- (2) 设备用户必须接受所承受的所有无线电干扰，即使干扰有可能
d' en compromettre le fonctionnement.

IC SAR Warning:

英文：此设备安装和操作时，散热器与身体的距离应至少为20厘米。

French: Lors de l' installation et de l' exploitation de ce dispositif, la distance entre le radiateur et le corps est d' au moins 20 cm.

Important: The operating temperature of the EUT can't exceed 85°C and shouldn't be lower than -40°C.

Hereby, Arduino S.r.l. declares that this product is in compliance with essential requirements and other relevant provisions of Directive 2014/53/EU. This product is allowed to be used in all EU member states.

Frequency bands	Typical Output Power
2.402-2480 MHz, 40 channels	+6dBm

10 NCC Low Power Warning

警語:

取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。

前述合法通信，指依電信管理法規定作業之無線電通信。

低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

11 SRRC

This equipment contains a radio transmitter module with model approval code: CMIIT ID: XXXXXXXXX.

12 Company Information

Company name	Arduino SRL
Company Address	Via Andrea Appiani, 25 - 20900 MONZA (Italy)

法文：在安装和操作此设备时，散热器与身体之间的距离应至少为20厘米。

重要提示：EUT 的工作温度不能超过 85°C，也不应低于 -40°C。

特此，Arduino S.r.l. 声明该产品符合 2014/53/EU 指令的基本要求及其他相关规定。该产品允许在所有欧盟成员国使用。

频率范围	典型输出功率
2.402-2480 MHz, 40 个信道	+6dBm

10 NCC Low Power Warning

警語:

取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

低功率射频设备的使用不得影响飞行安全及干扰合法通信；经发现有干扰现象时，应立即停用，并改善至无干扰时方可继续使用。

上述合法通信，指依据电信管理法规规定进行的无线电通信。

低功率射频设备必须忍受合法通信或工业、科学及医疗用电波辐射性电磁设备的干扰。

11 SRRC

该设备包含一个型号批准码为：CMIIT ID: XXXXXXXXX 的无线电发射模块。

12 Company Information

Company name	Arduino SRL
公司地址	安德烈亚·阿平尼街25号 - 20900 蒙扎（意大利）

13 Reference Documentation

Ref	Link
Arduino® IDE (Desktop)	https://www.arduino.cc/en/Main/Software
Arduino® IDE (Cloud)	https://create.arduino.cc/editor
Arduino® Cloud IDE Getting Started	https://create.arduino.cc/projecthub/Arduino_Genuino/getting-started-with-arduino-web-editor-4b3e4a
Arduino® Pro Website	https://www.arduino.cc/pro
Project Hub	https://create.arduino.cc/projecthub?by=part&part_id=11332&sort=trending
Library Reference	https://github.com/bcmilabs/Arduino_EdgeControl/tree/4dad0d95e93327841046c1ef80bd8b882614eac8
Online Store	https://store.arduino.cc/

13 Reference Documentation

Ref	Link
Arduino® IDE (桌面)	https://www.arduino.cc/en/Main/Software
Arduino® IDE (云)	https://create.arduino.cc/editor
Arduino® 云端 IDE 入门指南	https://create.arduino.cc/projecthub/Arduino_Genuino/开始使用Arduino网页editor-4b3e4a
Arduino® Pro 网站	https://www.arduino.cc/pro
项目中心	https://create.arduino.cc/projecthub?by=part&part_id=11332&sort=trending
库参考	https://github.com/bcmilabs/Arduino_EdgeControl/tree/4dad0d95e93327841046c1ef80bd8b882614eac8
在线商店	https://store.arduino.cc/

14 Revision History

Date	Revision	Changes
05/02/2025	8	Description updates
03/09/2024	7	Cloud Editor updated from Web Editor
09/01/2024	6	High-Performance Pressure Sensor information updated
03/07/2023	5	Certification Summary Table Updated
22/12/2022	4	Add NTC Image & addition pins info
13/12/2022	3	Change Solution Overview Image
20/07/2021	2	Technical Revisions
27/05/2021	1	Initial Version

14 Revision History

Date	修订	变更
05/02/2025	8	描述更新
03/09/2024	7	云编辑器已从网页编辑器更新
09/01/2024	6	高性能压力传感器信息已更新
03/07/2023	5	认证摘要表已更新
22/12/2022	4	添加 NTC 图片 & 补充引脚信息
13/12/2022	3	更改解决方案概述图片
20/07/2021	2	技术修订
27/05/2021	1	初始版本

15 Product Warnings and Disclaimers

THESE PRODUCTS ARE INTENDED FOR SALE TO AND INSTALLATION BY QUALIFIED PROFESSIONALS. ARDUINO CANNOT PROVIDE ANY ASSURANCE THAT ANY PERSON OR ENTITY BUYING ITS PRODUCTS, INCLUDING ANY "AUTHORIZED DEALER" OR "AUTHORIZED RESELLER", IS PROPERLY TRAINED OR EXPERIENCED TO CORRECTLY INSTALL RELATED PRODUCTS.

A PROPERLY INSTALLED AND MAINTAINED SYSTEM MAY ONLY REDUCE THE RISK OF EVENTS SUCH AS LOSS OF FUNCTIONALITY; IT IS NOT INSURANCE OR A GUARANTEE THAT SUCH EVENTS WILL NOT OCCUR, THAT ADEQUATE WARNING OR PROTECTION WILL BE PROVIDED, OR THAT THERE WILL BE NO DEATH, PERSONAL INJURY, AND/OR PROPERTY DAMAGE AS A RESULT.

BEFORE INSTALLING THE PRODUCTS, ENSURE THAT ITS FIRMWARE IS UPGRADED TO THE LATEST VERSION, AVAILABLE FOR DOWNLOAD FROM OUR WEBSITE. DURING THE LIFESPAN OF PRODUCTS, IT IS IMPORTANT TO CHECK ABOUT THE APPLICABILITY OF FIRMWARE UPDATES.

USERS SHOULD, WHERE APPLICABLE, CHANGE PASSWORDS FREQUENTLY AND ENSURE A HIGH-QUALITY PASSWORD (PASSWORDS SHOULD BE LONG AND COMPLEX ENOUGH, NEVER SHARED, AND ALWAYS UNIQUE). FURTHERMORE, IT IS THE USERS' RESPONSIBILITY TO KEEP ITS ANTI-VIRUS SYSTEM UP TO DATE.

WHILE ARDUINO MAKES REASONABLE EFFORTS TO REDUCE THE PROBABILITY THAT A THIRD PARTY MAY HACK, COMPROMISE OR CIRCUMVENT ITS SECURITY PRODUCTS, RELATED SOFTWARE OR CLOUD SERVERS, ANY SECURITY PRODUCT, SOFTWARE OR CLOUD SERVER MANUFACTURED, SOLD AND/OR LICENSED BY ARDUINO, MAY STILL BE HACKED, COMPROMISED AND/OR CIRCUMVENTED.

CERTAIN PRODUCTS OR SOFTWARE MANUFACTURED, SOLD OR LICENSED BY ARDUINO CONNECT TO THE INTERNET TO SEND AND/OR RECEIVE DATA ("INTERNET OF THINGS" OR "IOT" PRODUCTS). ANY CONTINUED USE OF AN IOT PRODUCT AFTER ARDUINO HAS CEASED SUPPORTING THAT IOT PRODUCT (E.G., THROUGH NOTICE THAT ARDUINO NO LONGER PROVIDES FIRMWARE UPDATES OR BUG FIXES) MAY RESULT IN REDUCED PERFORMANCE, MALFUNCTION, AND/OR INCREASED VULNERABILITY TO HACKING, COMPROMISE AND/OR CIRCUMVENTION.

ARDUINO DOES NOT ALWAYS ENCRYPT COMMUNICATIONS BETWEEN PRODUCTS AND THEIR PERIPHERAL DEVICES INCLUDING, BUT NOT LIMITED TO, SENSORS OR DETECTORS UNLESS REQUIRED BY APPLICABLE LAW. AS A RESULT THESE COMMUNICATIONS MAY BE INTERCEPTED AND COULD BE USED TO CIRCUMVENT YOUR SYSTEM.

THE ABILITY OF ARDUINO PRODUCTS AND SOFTWARE TO WORK PROPERLY DEPENDS ON A NUMBER OF PRODUCTS AND SERVICES MADE AVAILABLE BY THIRD PARTIES OVER WHICH ARDUINO HAS NO CONTROL INCLUDING, BUT NOT LIMITED TO, INTERNET, CELLULAR AND LANDLINE CONNECTIVITY; MOBILE DEVICE AND OPERATING SYSTEM COMPATIBILITY; AND PROPER INSTALLATION AND MAINTENANCE. ARDUINO SHALL NOT BE LIABLE FOR ANY DAMAGES CAUSED BY ACTIONS OR OMISSIONS OF THIRD PARTIES.

BATTERY OPERATED SENSORS, DETECTORS, KEYFOBS, DEVICES AND OTHER PANEL ACCESSORIES HAVE A LIMITED BATTERY LIFE. WHILE THESE PRODUCTS MAY BE DESIGNED TO PROVIDE SOME WARNING OF IMMINENT BATTERY DEPLETION, THE ABILITY TO DELIVER SUCH WARNINGS IS LIMITED AND SUCH WARNINGS MAY NOT BE PROVIDED IN ALL CIRCUMSTANCES. PERIODIC TESTING OF THE SYSTEM IN ACCORDANCE WITH PRODUCT DOCUMENTATION IS THE ONLY WAY TO DETERMINE IF ALL SENSORS, DETECTORS, KEYFOBS, DEVICES AND OTHER PANEL ACCESSORIES ARE FUNCTIONING PROPERLY.

15 Product Warnings and Disclaimers

这些产品专供合格专业人员购买和安装。Arduino不能保证任何购买其产品的人或实体（包括任何“授权经销商”或“授权分销商”）都经过适当培训或有经验，能够正确安装相关产品。

一个正确安装和维护的系统只能降低功能丧失等事件的风险；它不是保险或保证此类事件不会发生，或会提供充分的警告或保护，或不会因此造成死亡、人身伤害和/或财产损失。

在安装产品之前，请确保其固件已升级到最新版本，该版本可在我们的网站下载。在产品生命周期内，检查固件更新适用性非常重要。

用户应，在适用的情况下，经常更改密码并确保高质量密码（密码应足够长且复杂，绝不共享，且始终唯一）。此外，保持其防病毒系统更新是用户的责任。

虽然Arduino已尽合理努力减少第三方可能黑入、破坏或绕过其安全产品、相关软件或云服务器的可能性，但由Arduino制造、销售和/或许可的任何安全产品、软件或云服务器仍可能被黑入、破坏和/或绕过。

Arduino制造、销售或许可的某些产品或软件连接到互联网以发送和/或接收数据（“物联网”或“IoT”产品）。在Arduino停止支持该IoT产品后（例如，通过通知Arduino不再提供固件更新或错误修复）继续使用IoT产品可能导致性能降低、功能故障和/或增加被黑入、破坏和/或绕过的风险。

ARDUINO 并非总是加密产品与其外围设备（包括但不限于传感器或探测器）之间的通信，除非法律要求。因此，这些通信可能会被拦截，并可能被用于规避您的系统。

ARDUINO 产品和软件能够正常运行的能力取决于第三方提供的多种产品和服务的可用性，而 ARDUINO 对此没有控制权，包括但不限于互联网、蜂窝网络和固定线路连接；移动设备和操作系统兼容性；以及正确的安装和维护。ARDUINO 对因第三方行为或疏忽造成的任何损害概不负责。

电池供电的传感器、探测器、钥匙扣、设备和其他面板附件具有有限的电池寿命。虽然这些产品设计为在电池即将耗尽时提供一些警告，但提供此类警告的能力有限，在所有情况下可能无法提供此类警告。根据产品文档定期测试系统是确定所有传感器、探测器、钥匙扣、设备和其他面板附件是否正常工作的唯一方法。

CERTAIN SENSORS, DEVICES AND OTHER PANEL ACCESSORIES MAY BE PROGRAMMED INTO PANEL AS "SUPERVISORY" SO THAT THE PANEL WILL INDICATE IF IT DOES NOT RECEIVE A REGULAR SIGNAL FROM THE DEVICE WITHIN A CERTAIN PERIOD OF TIME. CERTAIN DEVICES CANNOT BE PROGRAMMED AS SUPERVISORY. DEVICES CAPABLE OF BEING PROGRAMMED AS SUPERVISORY MAY NOT BE PROPERLY PROGRAMMED AT INSTALLATION, RESULTING IN A FAILURE TO REPORT TROUBLE WHICH COULD RESULT IN DEATH, SERIOUS INJURY AND/OR PROPERTY DAMAGE.

PURCHASED PRODUCTS CONTAIN SMALL PARTS THAT COULD BE A CHOKING HAZARD TO CHILDREN OR PETS. KEEP ALL SMALL PARTS AWAY FROM CHILDREN AND PETS.

BUYER SHALL PASS ON THE FOREGOING INFORMATION ON PRODUCT RISKS, WARNINGS AND DISCLAIMERS TO ITS CUSTOMERS AND END USERS.

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ARDUINO MAKES NO REPRESENTATION, WARRANTY, COVENANT OR PROMISE THAT ITS PRODUCTS AND/OR RELATED SOFTWARE (I) WILL NOT BE HACKED, COMPROMISED AND/OR CIRCUMVENTED; (II) WILL PREVENT, OR PROVIDE ADEQUATE WARNING OR PROTECTION FROM, BREAK-INS, BURGLARY, ROBBERY, FIRE; OR (III) WILL WORK PROPERLY IN ALL ENVIRONMENTS AND APPLICATIONS.

ARDUINO WILL NOT BE LIABLE FOR UNAUTHORIZED ACCESS (I.E. HACKING) INTO THE CLOUD SERVERS OR TRANSMISSION FACILITIES, PREMISES OR EQUIPMENT, OR FOR UNAUTHORIZED ACCESS TO DATA FILES, PROGRAMS, PROCEDURES OR INFORMATION THEREON, UNLESS AND ONLY TO THE EXTENT THAT THIS DISCLAIMER IS PROHIBITED BY APPLICABLE LAW.

SYSTEMS SHOULD BE CHECKED BY A QUALIFIED TECHNICIAN AT LEAST EVERY TWO YEARS UNLESS OTHERWISE INSTRUCTED IN THE PRODUCT DOCUMENTATION AND, IF APPLICABLE, THE BACKUP BATTERY REPLACED AS REQUIRED.

ARDUINO MAY MAKE CERTAIN BIOMETRIC CAPABILITIES (E.G., FINGERPRINT, VOICE PRINT, FACIAL RECOGNITION, ETC.) AND/OR DATA RECORDING CAPABILITIES (E.G., VOICE RECORDING), AND/OR DATA/INFORMATION RECOGNITION AND/OR TRANSLATION CAPABILITIES AVAILABLE IN PRODUCTS ARDUINO MANUFACTURES AND/OR RESELLS. ARDUINO DOES NOT CONTROL THE CONDITIONS AND METHODS OF USE OF PRODUCTS IT MANUFACTURES AND/OR RESELLS. THE END-USER AND/OR INSTALLER AND/OR DISTRIBUTOR ACT AS CONTROLLER OF THE DATA RESULTING FROM USE OF THESE PRODUCTS, INCLUDING ANY RESULTING PERSONALLY IDENTIFIABLE INFORMATION OR PRIVATE DATA, AND ARE SOLELY RESPONSIBLE TO ENSURE THAT ANY PARTICULAR INSTALLATION AND USE OF ARDUINO'S PRODUCTS COMPLY WITH ALL APPLICABLE PRIVACY AND OTHER LAWS, INCLUDING ANY REQUIREMENT TO OBTAIN CONSENT FROM OR PROVIDE NOTICE TO INDIVIDUALS AND ANY OTHER OBLIGATIONS END-USER AND/OR INSTALLER MAY HAVE AS CONTROLLERS OR OTHERWISE UNDER LAW. THE CAPABILITY OR USE OF ANY PRODUCTS MANUFACTURED OR SOLD BY ARDUINO TO RECORD CONSENT SHALL NOT BE SUBSTITUTED FOR THE CONTROLLER'S OBLIGATION TO INDEPENDENTLY DETERMINE WHETHER CONSENT OR NOTICE IS REQUIRED, NOR SHALL SUCH CAPABILITY OR USE SHIFT ANY OBLIGATION TO OBTAIN ANY REQUIRED CONSENT OR NOTICE TO ARDUINO.

THE INFORMATION IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. UPDATED INFORMATION CAN BE FOUND ON OUR WEB PRODUCT PAGE. ARDUINO ASSUMES NO RESPONSIBILITY FOR INACCURACIES OR

某些传感器、设备和其他面板附件可能被编程为面板上的“监督”模式，以便面板在特定时间段内未从设备接收到常规信号时指示。某些设备不能被编程为监督模式。可被编程为监督模式的设备在安装时可能未正确编程，导致无法报告故障，这可能导致死亡、严重伤害和/或财产损失。

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購買者應將上述產品風險、警告和免責聲明傳遞給其客戶和最終用戶。

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系统应至少每两年由合格技术人员检查，除非产品文档另有指示，并且如果适用，应根据需要更换备用电池。

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