

Description

The Arduino® UNO R4 WiFi is the first UNO board to feature a 32-bit microcontroller and an ESP32-S3 Wi-Fi® module (ESP32-S3-MINI-1-N8). It features a RA4M1 series microcontroller from Renesas (R7FA4M1AB3CFM#AA0), based on a 48 MHz Arm® Cortex®-M4 microprocessor. The UNO R4 WiFi's memory is larger than its predecessors, with 256 kB flash, 32 kB SRAM and 8 kB of EEPROM.

The RA4M1's operating voltage is fixed at 5 V, whereas the ESP32-S3 module is 3.3 V. Communication between these two MCUs is performed via a logic-level translator (TXB0108DQSR).

Target areas:

Maker, beginner, education



Features

The **R7FA4M1AB3CFM#AA0**, often referred to as RA4M1 in this datasheet, is the main MCU on the UNO R4 WiFi, connected to all pin headers on the board as well as all communication buses.

▪ Overview

- 48 MHz Arm® Cortex®-M4 microprocessor with a floating point unit (FPU)
- 5 V operating voltage
- Real-time Clock (RTC)
- Memory Protection Unit (MPU)
- Digital-to-analog Converter (DAC)

▪ Memory

- 256 kB Flash Memory
- 32 kB SRAM
- 8 kB Data Memory (EEPROM)

▪ Peripherals

- Capacitive Touch Sensing Unit (CTSU)
- USB 2.0 Full-Speed Module (USBFS)
- 14-bit ADC
- Up to 12-bit DAC
- Operational Amplifier (OPAMP)

▪ Power

- Operating voltage for RA4M1 is 5 V
- Recommended input voltage (VIN) is 6-24 V
- Barrel jack connected to VIN pin (6-24 V)
- Power via USB-C® at 5 V

▪ Communication

- 1x UART (pin D0, D1)
- 1x SPI (pin D10-D13, ICSP header)
- 1x I2C (pin A4, A5, SDA, SCL)
- 1x CAN (pin D4, D5, external transceiver is required)

See the full datasheet for the R7FA4M1AB3CFM#AA0 in the link below:

▪ R7FA4M1AB3CFM#AA0 datasheet

The **ESP32-S3-MINI-1-N8** is the secondary MCU with a built-in antenna for Wi-Fi® & Bluetooth® connectivity. This module operates on 3.3 V and communicates with the RA4M1 using a logic-level translator (TXB0108DQSR).

▪ Overview

- Xtensa® dual-core 32-bit LX7 microprocessor
- 3.3 V operating voltage
- 40 MHz crystal oscillator



- **Wi-Fi®**

- Wi-Fi® support with 802.11 b/g/n standard (Wi-Fi® 4)
- Bit rate up to 150 Mbps
- 2.4 GHz band

- **Bluetooth®**

- Bluetooth® 5

See the full datasheet for the ESP32-S3-MINI-1-N8 in the link below:

- [ESP32-S3-MINI-1-N8 datasheet](#)



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1 The Board

1.1 Application Examples

The UNO R4 WiFi is part of the first UNO series of 32-bit development boards, being previously based on 8-bit AVR microcontrollers. There are thousands of guides, tutorials and books written about the UNO board, where the UNO R4 WiFi continues its legacy.

The board features 14 digital I/O ports, 6 analog channels, dedicated pins for I2C, SPI and UART connections. It has a significantly larger memory: 8 times more flash memory (256 kB) and 16 times more SRAM (32 kB). With a 48 MHz clock speed, it is also 3x faster than its predecessors.

In addition, it features an ESP32-S3 module for Wi-Fi® & Bluetooth® connectivity, as well as a built-in 12x8 LED matrix, making it one of the most visually unique Arduino boards to date. The LED matrix is fully programmable, where you can load anything from still frames to custom animations.

Entry-level projects: If this is your first project within coding and electronics, the UNO R4 WiFi is a good fit. It is easy to get started with, and it has a lot of online documentation.

Easy IoT applications: build projects without writing any networking code in the Arduino Cloud. Monitor your board, connect it with other boards and services, and develop cool IoT projects.

LED Matrix: the 12x8 LED matrix on the board can be used for showing animations, text scrolling, create mini-games and much more, being the perfect feature to give your project more personality.

1.2 Related Products

- UNO R3
- UNO R3 SMD
- UNO R4 Minima

Rating

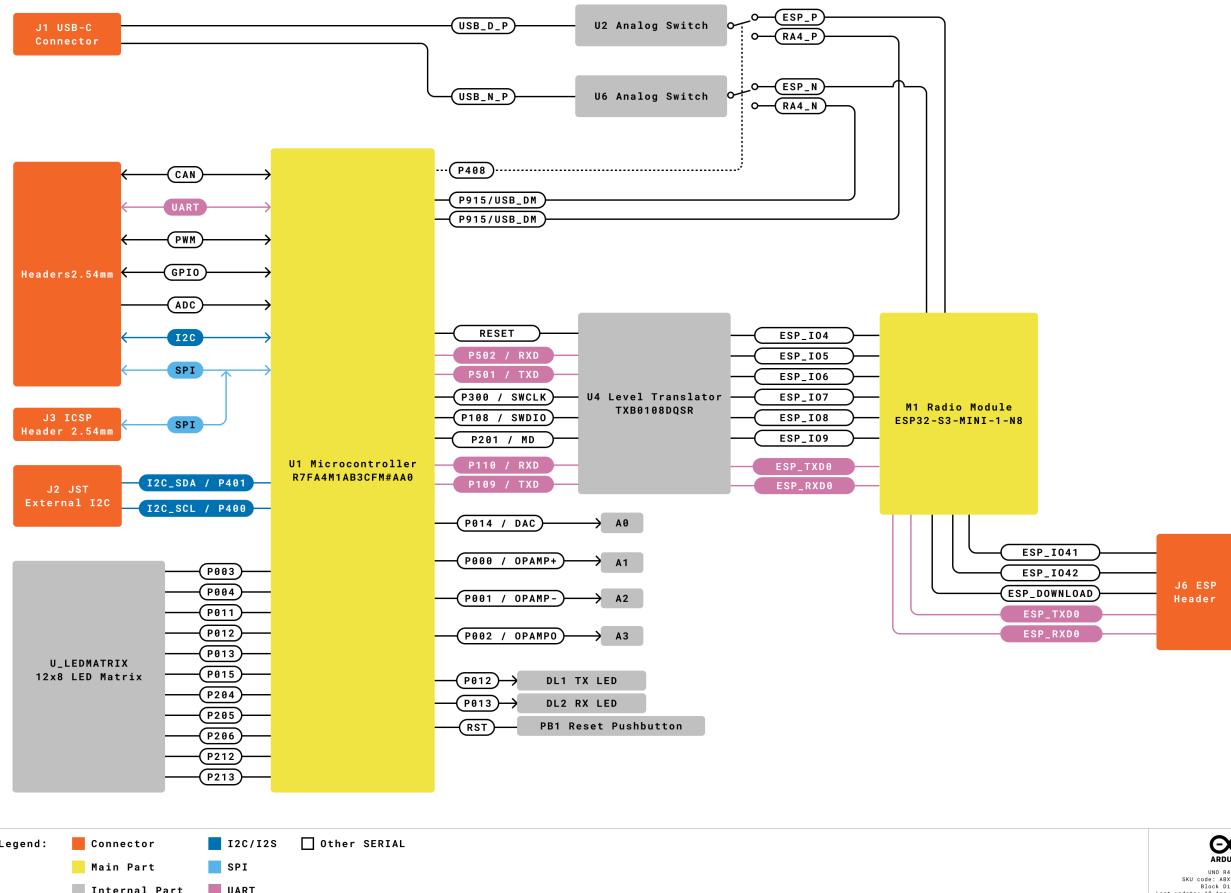
2 Recommended Operating Conditions

Symbol	Description	Min	Typ	Max	Unit
V_{IN}	Input voltage from VIN pad / DC Jack	6	7.0	24	V
V_{USB}	Input voltage from USB connector	4.8	5.0	5.5	V
T_{OP}	Operating Temperature	-40	25	85	°C

Note: V_{DD} controls the logic level and is connected to the 5V power rail. V_{AREF} is for the analog logic.

Functional Overview

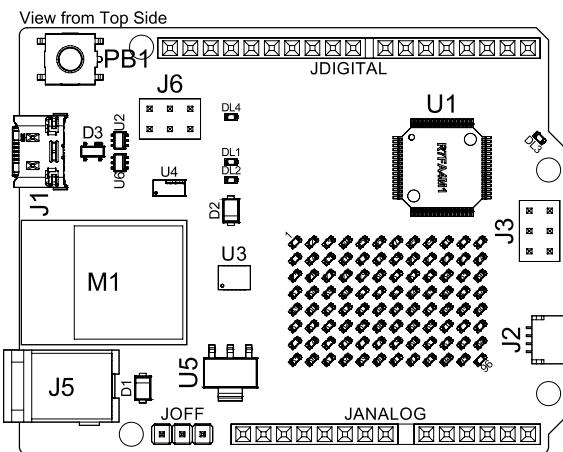
3 Block Diagram



Arduino R4 WiFi Block Diagram

4 Board Topology

4.1 Front View



Top View of Arduino Uno R4 WiFi

Ref.	Description
U1	R7FA4M1AB3CFM#AA0 Microcontroller IC
U2	NLASB3157DFT2G Multiplexer
U3	ISL854102FRZ-T Buck Converter
U4	TXB0108DQSR logic level translator (5 V - 3.3 V)
U5	SGM2205-3.3XKC3G/TR 3.3 V linear regulator
U6	NLASB3157DFT2G Multiplexer
U_LEDMATRIX	12x8 LED Red Matrix
M1	ESP32-S3-MINI-1-N8
PB1	RESET Button
JANALOG	Analog input/output headers
JDIGITAL	Digital input/output headers
JOFF	OFF, VRTC header
J1	CX90B-16P USB-C® connector
J2	SM04B-SRSS-TB(LF)(SN) I2C connector
J3	ICSP header (SPI)
J5	DC Jack
J6	ESP header
DL1	LED TX (serial transmit)



Ref.	Description
DL2	LED RX (serial receive)
DL3	LED Power (green)
DL4	LED SCK (serial clock)
D1	PMEG6020AELRX Schottky Diode
D2	PMEG6020AELRX Schottky Diode
D3	PRTR5V0U2X,215 ESD Protection

5 Microcontroller (R7FA4M1AB3CFM#AA0)

The UNO R4 WiFi is based on the 32-bit RA4M1 series microcontroller, **R7FA4M1AB3CFM#AA0**, from Renesas, which uses a 48 MHz Arm® Cortex®-M4 microprocessor with a floating point unit (FPU).

The operating voltage for the RA4M1 is fixed at 5 V as to be hardware compatible with shields, accessories & circuits based on previous Arduino UNO boards.

The R7FA4M1AB3CFM#AA0 features:

- 256 kB flash / 32 kB SRAM / 8 kB data flash (EEPROM)
- Real-time Clock (RTC)
- 4x Direct Memory Access Controller (DMAC)
- 14-bit ADC
- Up to 12-bit DAC
- OPAMP
- CAN bus

For more technical details on this microcontroller, visit the Renesas - RA4M1 series official documentation.

6 Wi-Fi® / Bluetooth® Module (ESP32-S3-MINI-1-N8)

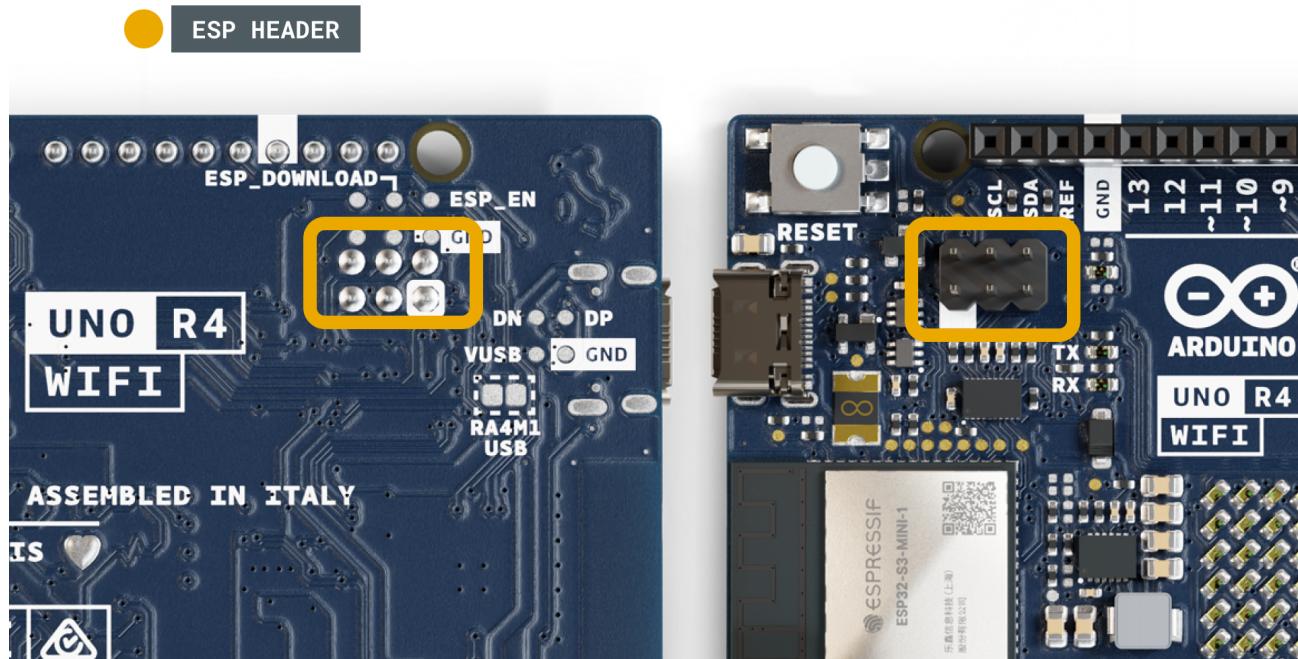
The Wi-Fi® / Bluetooth® LE module on the UNO R4 WiFi is from the ESP32-S3 SoCs. It features the Xtensa® dual-core 32-bit LX7 MCU, a built-in antenna and support for 2.4 GHz bands.

The ESP32-S3-MINI-1-N8 features:

- Wi-Fi® 4 - 2.4 GHz band
- Bluetooth® 5 LE support
- 3.3 V operating voltage
- 384 kB ROM
- 512 kB SRAM
- Up to 150 Mbps bit rate

This module acts as a secondary MCU on the UNO R4 WiFi, and communicates with the RA4M1 MCU using a logic-level translator. Note that this module operates on 3.3 V as opposed to the RA4M1's 5 V operating voltage.

6.1 ESP Header

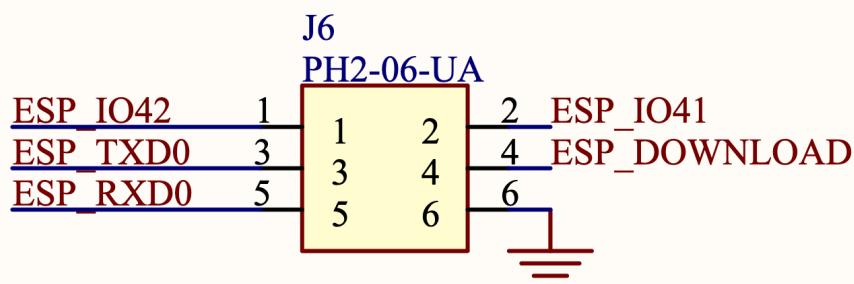


ESP header.

The header located close to the RESET button can be used to access the ESP32-S3 module directly. The pins accessible are:

- **ESP_I042** - MTMS debugging (Pin 1)
- **ESP_I041** - MTDI debugging (Pin 2)
- **ESP_TXD0** - Serial Transmit (UART) (Pin 3)
- **ESP_DOWNLOAD** - boot (Pin 4)
- **ESP_RXD0** - Serial Receive (UART) (Pin 5)
- **GND** - ground (Pin 6)

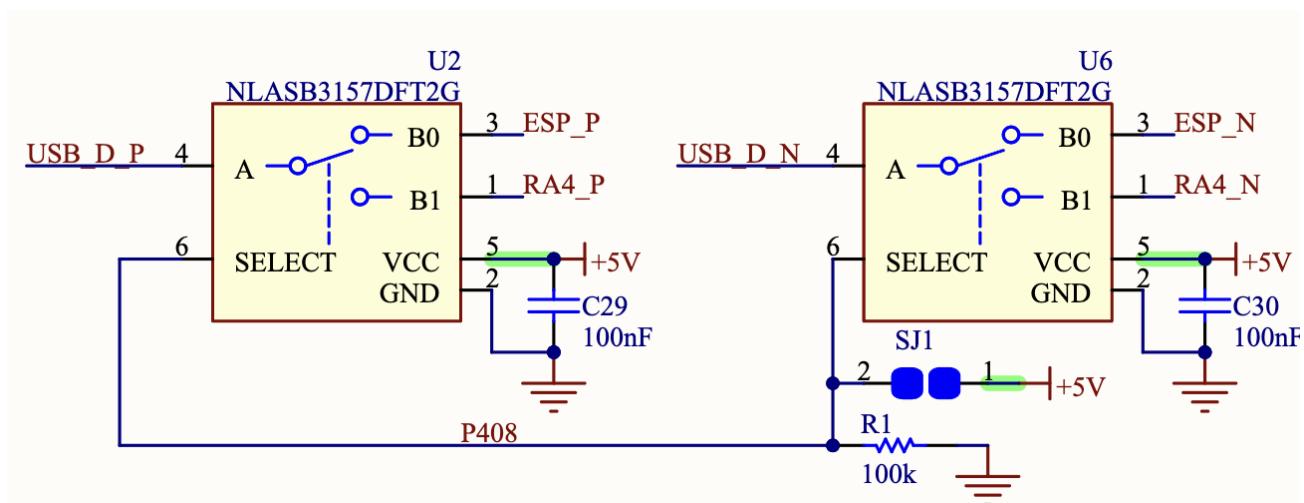
ESP HEADER



ESP header (schematic)

6.2 USB Bridge

When programming the UNO R4 WiFi, the RA4M1 MCU is programmed via the ESP32-S3 module by default. The **U2** and **U6** switches can switch the USB communication to go directly to the RA4M1 MCU, by writing a high state to the P408 pin (D40).



Soldering together the **SJ1** pads permanently sets the USB communication directly to the RA4M1, bypassing the ESP32-S3.

7 USB Connector

The UNO R4 WiFi has one USB-C® port, used to power and program your board as well as sending & receiving serial communication.

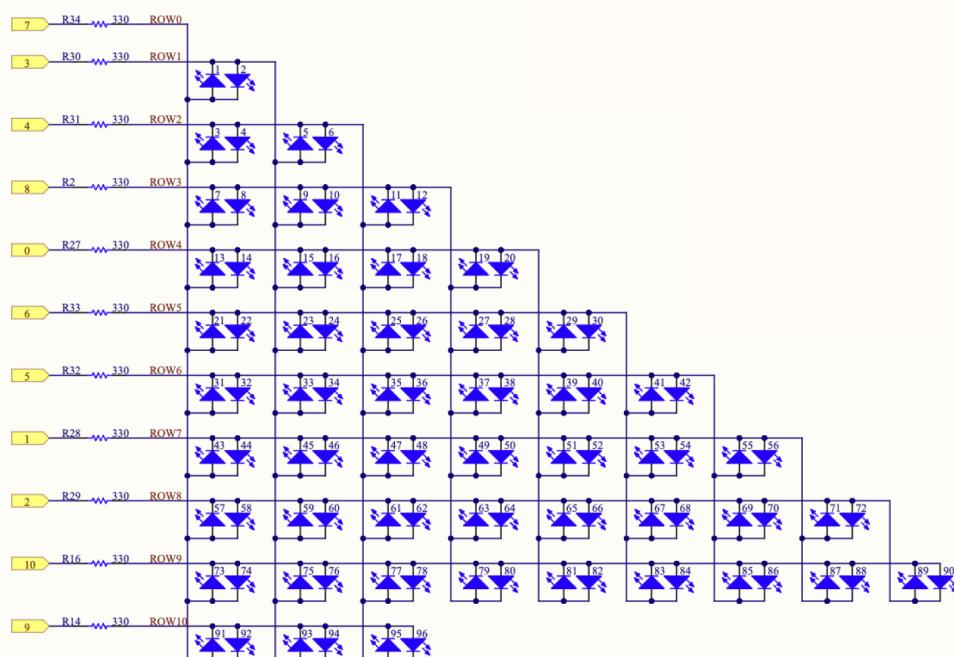
Note: The board should not be powered with more than 5 V via the USB-C® port.

8 LED Matrix

The UNO R4 WiFi features a 12x8 matrix of red LEDs (**U_LEDMATRIX**), connected using the technique known as charlieplexing.

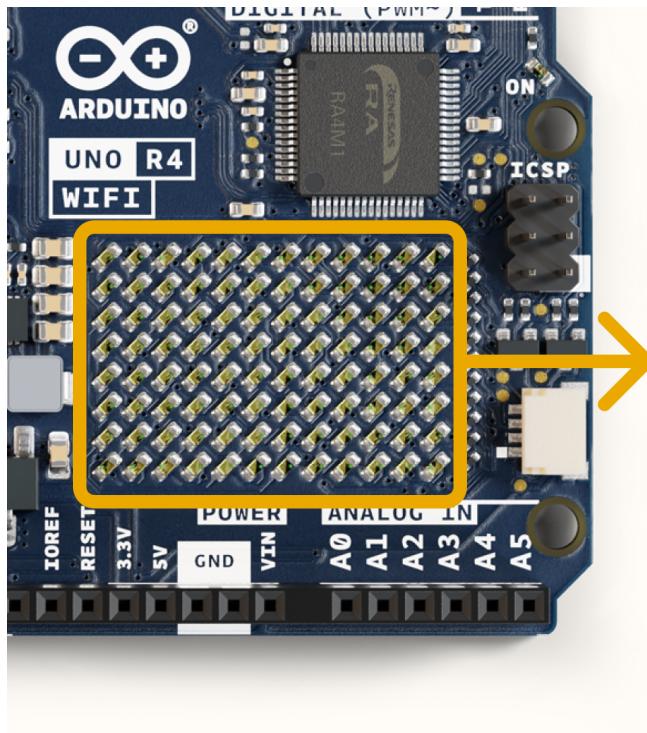
The following pins on the RA4M1 MCU are used for the matrix:

- P003
- P004
- P011
- P012
- P013
- P015
- P204
- P205
- P206
- P212
- P213



LED matrix schematics.

These LEDs can be accessed as an array, using a specific library. See the mapping below:



1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81	82	83	84
85	86	87	88	89	90	91	92	93	94	95	96

LED matrix number mapping.

This matrix can be used for a number of projects and prototyping purposes, and supports animation, simple game designs and scrolling text among other things.

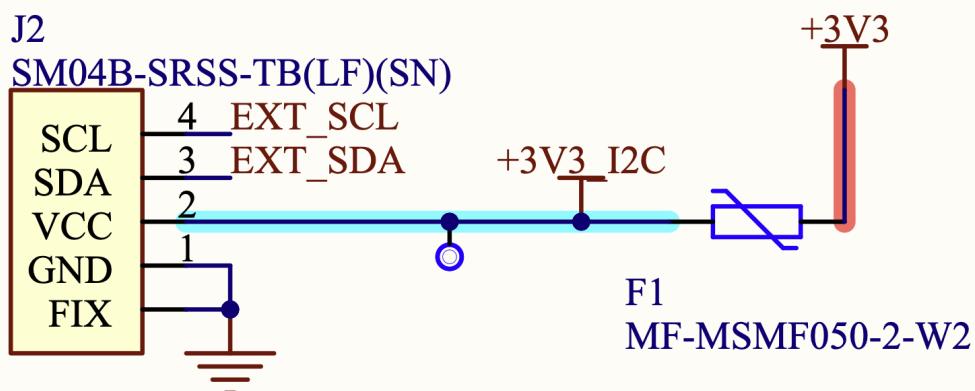
9 Digital Analog Converter (DAC)

The UNO R4 WiFi has a DAC with up to 12-bit resolution attached to the A0 analog pin. A DAC is used to convert a digital signal to an analog signal.

The DAC can be used for signal generation for e.g. audio applications, like generating and altering sawtooth waves.

10 I2C Connector

The I2C connector SM04B-SRSS-TB(LF)(SN) is connected to a secondary I2C bus on the board. Note that this connector is powered via 3.3 V.



I2C connector.

This connector also shares the following pin connections:

JANALOG header

- A4
- A5

JDIGITAL header

- SDA
- SCL

Note: as A4/A5 is connected to the main I2C bus, these should not be used as ADC inputs whenever the bus is in use. You can however connect I2C devices to each of these pins and connectors simultaneously.

11 Power Options

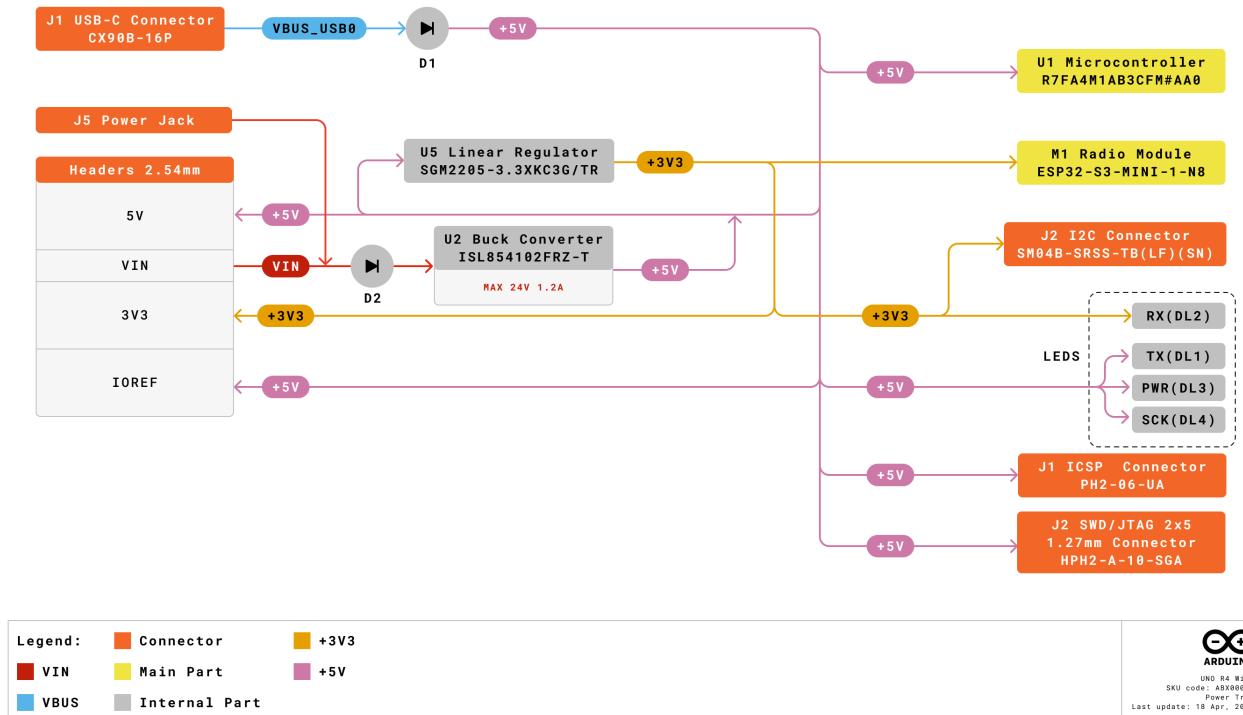
Power can either be supplied via the VIN pin, or via USB-C® connector. If power is supplied via VIN, the ISL854102FRZ buck converter steps the voltage down to 5 V.

Both VUSB and VIN pins are connected to the ISL854102FRZ buck converter, with Schottky diodes in place for reverse polarity & overvoltage protection respectively.

Power via USB supplies about ~4.7 V (due to Schottky drop) to the RA4M1 MCU.

The linear regulator (SGM2205-3.3XKC3G/TR) converts 5 V from either the buck converter or USB, and provides 3.3 V to a number of components, including the ESP32-S3 module.

11.1 Power Tree



Arduino Uno R4 WiFi power tree.



11.2 Pin Voltage

The general operating voltage for UNO R4 WiFi is 5 V, however the ESP32-S3 module's operating voltage is 3.3 V.

Note: It is **very** important that ESP32-S3's pins (3.3 V) do not come in contact with any of the RA4M1's pins (5 V), as this may damage the circuits.

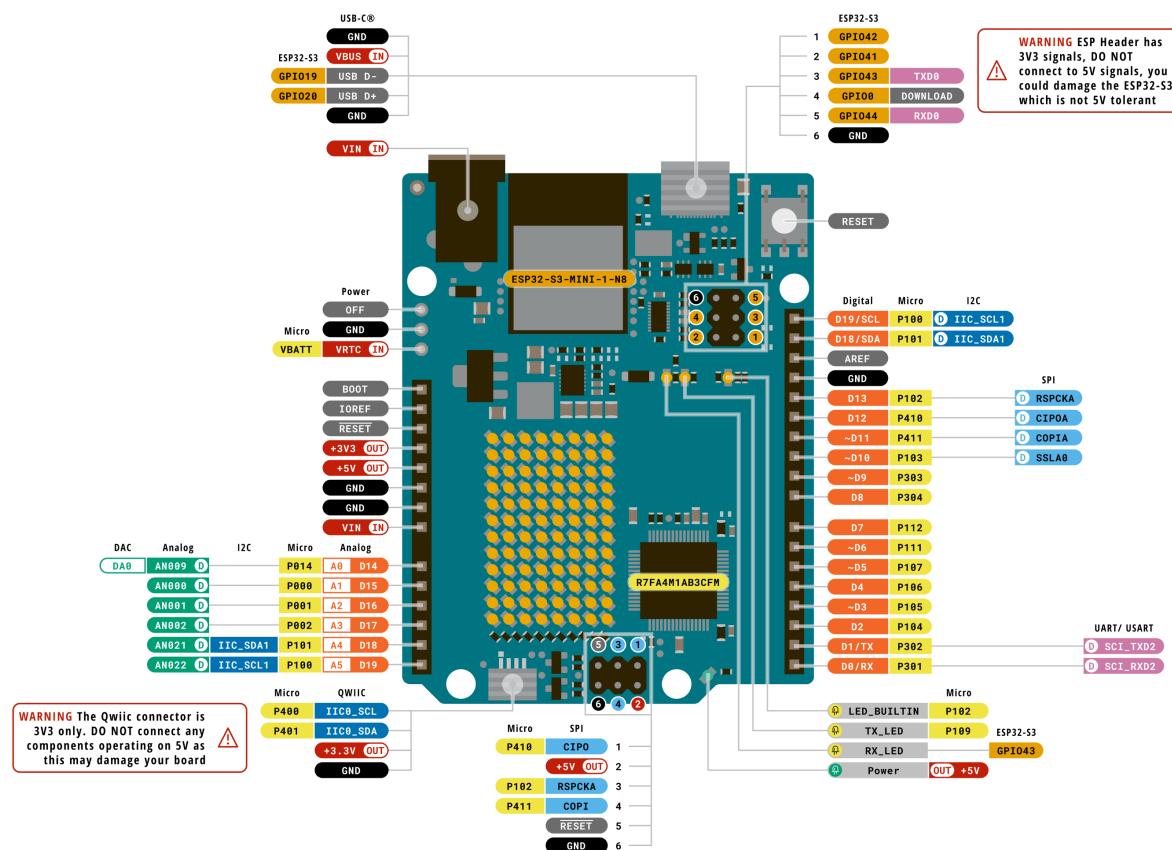
11.3 Pin Current

The GPIOs on the R7FA4M1AB3CFM#AA0 microcontroller can safely handle up to 8 mA of current. Never connect devices that draw higher current directly to a GPIO as this may damage the circuit.

For powering e.g. servo motors, always use an external power supply.

Mechanical Information

12 Pinout



Pinout for UNO R4 WiFi.



12.1 Analog

Pin	Function	Type	Description
1	BOOT	NC	Not Connected
2	IOREF	IOREF	Reference for digital logic V - connected to 5 V
3	Reset	Reset	Reset
4	+3V3	Power	+3V3 Power Rail
5	+5V	Power	+5V Power Rail
6	GND	Power	Ground
7	GND	Power	Ground
8	VIN	Power	Voltage Input
9	A0	Analog	Analog input 0 / DAC
10	A1	Analog	Analog input 1 / OPAMP+
11	A2	Analog	Analog input 2 / OPAMP-
12	A3	Analog	Analog input 3 / OPAMPOut
13	A4	Analog	Analog input 4 / I2C Serial Datal (SDA)
14	A5	Analog	Analog input 5 / I2C Serial Clock (SCL)

12.2 Digital

Pin	Function	Type	Description
1	SCL	Digital	I2C Serial Clock (SCL)
2	SDA	Digital	I2C Serial Datal (SDA)
3	AREF	Digital	Analog Reference Voltage
4	GND	Power	Ground
5	D13/SCK/CANRX0	Digital	GPIO 13 / SPI Clock / CAN Receiver (RX)
6	D12/CIPO	Digital	GPIO 12 / SPI Controller In Peripheral Out
7	D11/COPI	Digital	GPIO 11 (PWM) / SPI Controller Out Peripheral In
8	D10/CS/CANTX0	Digital	GPIO 10 (PWM) / SPI Chip Select / CAN Transmitter (TX)
9	D9	Digital	GPIO 9 (PWM~)
10	D8	Digital	GPIO 8
11	D7	Digital	GPIO 7
12	D6	Digital	GPIO 6 (PWM~)
13	D5	Digital	GPIO 5 (PWM~)
14	D4	Digital	GPIO 4
15	D3	Digital	GPIO 3 (PWM~) / Interrupt Pin
16	D2	Digital	GPIO 2 / Interrupt Pin
17	D1/TX0	Digital	GPIO 1 / Serial 0 Transmitter (TX)
18	D0/TX0	Digital	GPIO 0 / Serial 0 Receiver (RX)

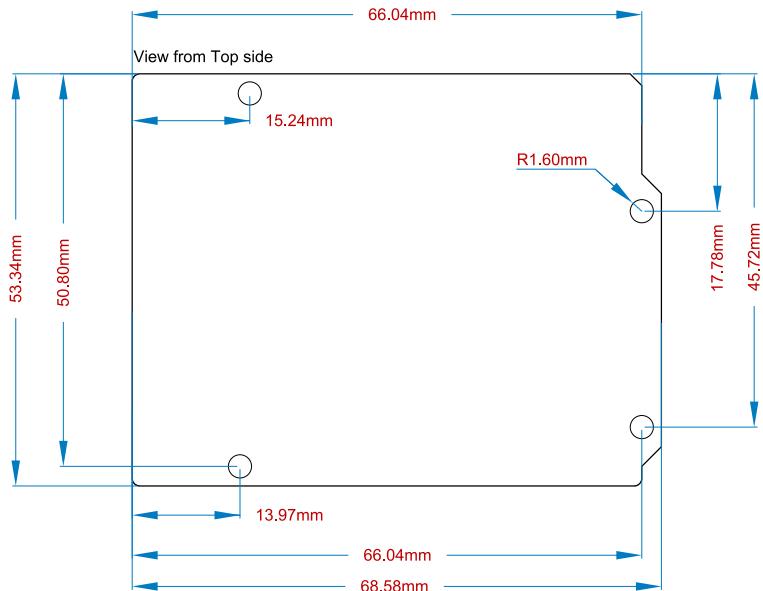
12.3 OFF

Pin	Function	Type	Description
1	OFF	Power	For controlling power supply
2	GND	Power	Ground
1	VRTC	Power	Battery connection to power RTC only

12.4 ICSP

Pin	Function	Type	Description
1	CIPO	Internal	Controller In Peripheral Out
2	+5V	Internal	Power Supply of 5 V
3	SCK	Internal	Serial Clock
4	COPI	Internal	Controller Out Peripheral In
5	RESET	Internal	Reset
6	GND	Internal	Ground

13 Mounting Holes And Board Outline



Top side Mechanical View of Arduino Uno R4 WiFi



14 Board Operation

14.1 Getting Started - IDE

If you want to program your UNO R4 WiFi while offline you need to install the Arduino® Desktop IDE [1]. To connect the UNO R4 WiFi to your computer, you will need a Type-C® USB cable, which can also provide power to the board, as indicated by the LED (DL1).

14.2 Getting Started - Arduino Web Editor

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

The Arduino Web 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.

14.3 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.

14.4 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 existing projects on Arduino Project Hub [4], the Arduino Library Reference [5], and the online store [6]; where you will be able to complement your board with sensors, actuators and more.

14.5 Board Recovery

All Arduino boards have a built-in bootloader which 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.



Certifications

15 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).

16 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.



17 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.

18 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 20 cm between the radiator & your body.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

English: User manuals for licence-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 licence-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'doit 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.

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.

19 SRRC

This equipment contains a radio transmitter module with model approval code: CMIIT ID: 2022DP6085.

20 Company Information

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



21 Reference Documentation

Ref	Link
Arduino IDE (Desktop)	https://www.arduino.cc/en/Main/Software
Arduino IDE (Cloud)	https://create.arduino.cc/editor
Cloud IDE Getting Started	https://docs.arduino.cc/cloud/web-editor/tutorials/getting-started/getting-started-web-editor
Project Hub	https://create.arduino.cc/projecthub?by=part&part_id=11332&sort=trending
Library Reference	https://github.com/arduino-libraries/
Online Store	https://store.arduino.cc/

22 Change Log

Date	Revision	Changes
19/09/2023	4	Update FCC section
25/07/2023	3	Update Pin Table
30/06/2023	2	Update Pinout File
08/06/2023	1	First Release

(ZH)

Arduino® UNO R4 WiFi 32位ESP32-S3 Wi-Fi® 模块 (ESP32-S3-MINI-1-N8) 基于Renesas RA4M1 48 MHz Arm® Cortex®-M4 MCU，带有256 kB闪存和32 kB SRAM，以及8 kB EEPROM。

RA4M1 5V电源输入，通过ESP32-S3的3.3V引脚为MCU供电。该模块还包含一个TXB0108DQSR隔离器。



Arduino UNO R4 WiFi

R7FA4M1AB3CFM#AA0

- **MCU**
 - 48 MHz Arm® Cortex®-M4 processor (FPU)
 - 5V
 - 32MHz(RTC)
 - 16MHz(MPU)
 - 12MHz(DAC)
- **Memory**
 - 256kB Flash
 - 32kB SRAM
 - 8kB EEPROM
- **Analog**
 - 10-bit ADC
 - 12-bit DAC
 - 1 opamp (OPAMP)
- **Power**
 - RA4M1 5V
 - 3.3V (VIN) 6-24 V
 - 5V (VIN) 6-24 V
 - USB-C®, 5V
- **Serial**
 - 1xUART D0-D1
 - 1xSPI D10-D13 ICSP
 - 1xI2C A4-A5 SDA SCL
 - 1xCAN D4-D5

Arduino UNO R4 WiFi R7FA4M1AB3CFM#AA0

- R7FA4M1AB3CFM#AA0

ESP32-S3-MINI-1-N8

Arduino UNO R4 WiFi

-



- Xtensa® LX32 LX7000
 - 3.3V
 - 40 MHz
 - **Wi-Fi®**
 - 802.11 b/g/n Wi-Fi® Wi-Fi® 40
 - 150 Mbps
 - 2.4GHz
 - **Bluetooth®**
 - Bluetooth 5
- ESP32-S3-MINI-1-N8
- ESP32-S3-MINI-1-N8

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23.1

UNO R4 WiFi 32位处理器，带有8个AVR微控制器的UNO兼容板。UNO R4 WiFi 包含14个GPIO、6个引脚、I2C/SPI 和 UART。包含256 kB闪存、8 kB SRAM 和 32 kB EEPROM。运行48 MHz。ESP32-S3 支持Wi-Fi® 和 Bluetooth®。12x8 LED 矩阵。Arduino 兼容LED 接口。该板完全兼容Arduino。Arduino 兼容引脚。LED 矩阵 12x8 LED。



23.1.1

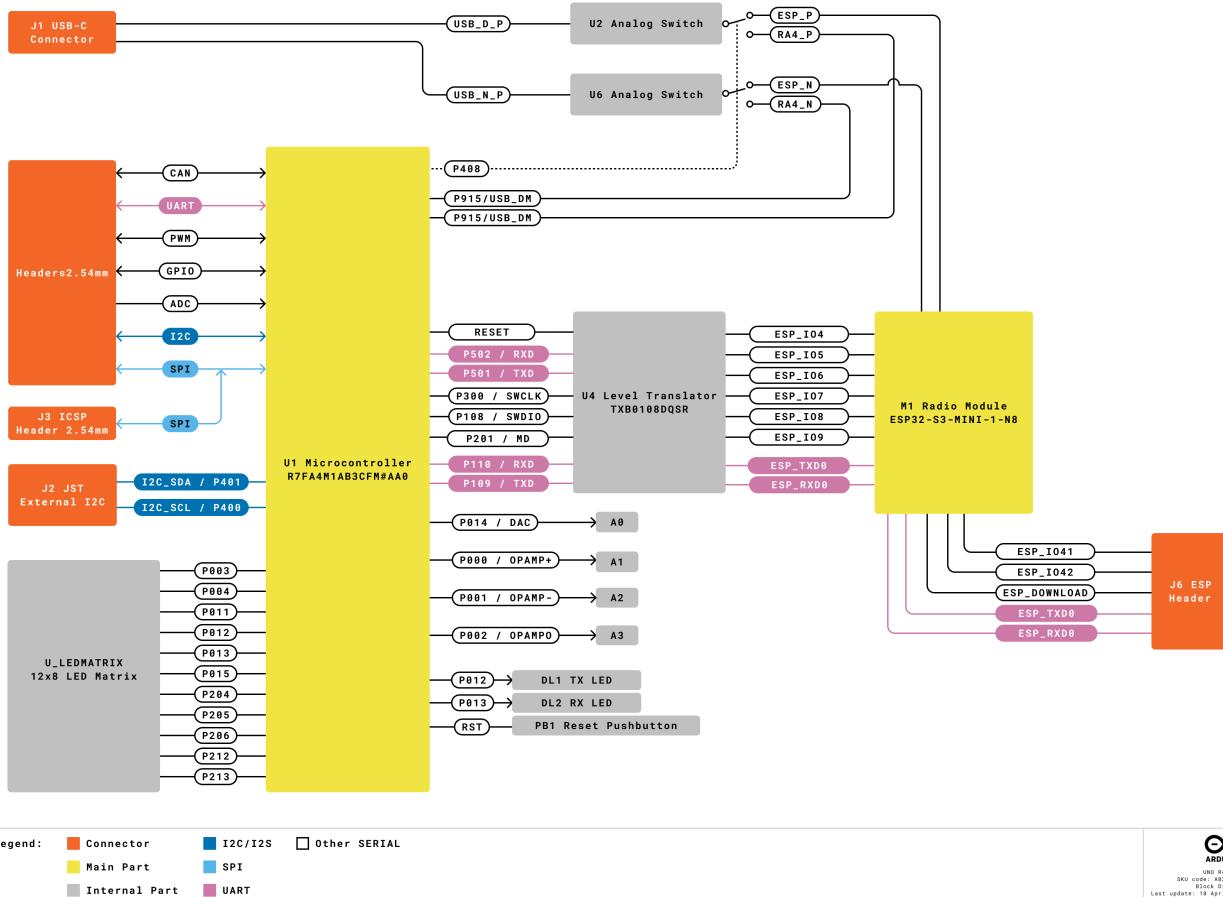
- UNO R3
- UNO R3 SMD
- UNO R4 Minima

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參數	說明	範例	單位	範例	範例
V_{IN}	VIN 參數 / DC 電壓範例	6	V	7.0	24
V_{USB}	USB 電壓範例	4.8	V	5.0	5.5
T_{OP}	溫度範例	-40	°C	25	85

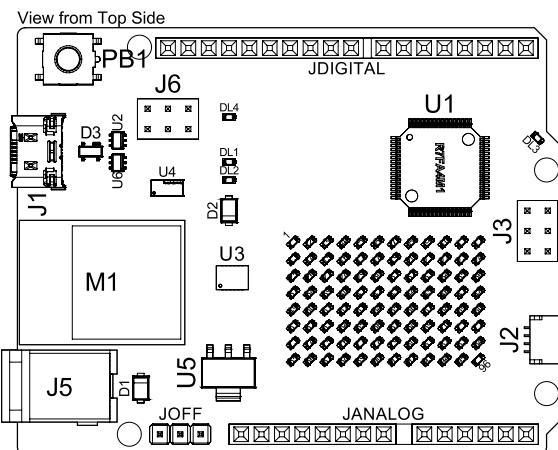
參數 V_{DD} 說明範例範例範例5V範例範例範例 V_{AREF} 說明範例範例

25



26

26.1



Arduino Uno R4 WiFi □□□

□□	□□
U1	R7FA4M1AB3CFM#AA0 □□□□ IC
U2	NLASB3157DFT2G □□□□
U3	ISL854102FRZ-T □□□□
U4	TXB0108DQSR □□□□□□□□ 5 V - 3.3 V
U5	SGM2205-3.3XKC3G/TR 3.3 V □□□□
U6	NLASB3157DFT2G □□□□
U_LEDMATRIX	12x8 LED □□□□
M1	ESP32-S3-MINI-1-N8
PB1	RESET □□□□
JANALOG	□□□□/□□□□
JDIGITAL	□□□□/□□□□
JOFF	OFF, VRTC □□
J1	CX90B-16P USB-C® □□□
J2	SM04B-SRSS-TB(LF)(SN) I2C □□□
J3	ICSP □□□SPI□
J5	□□□□□□
J6	ESP □□
DL1	LED TX□□□□□□



Pin	Description
DL2	LED RX
DL3	LED
DL4	LED SCK
D1	PMEG6020AELRX
D2	PMEG6020AELRX
D3	PRTR5V0U2X,215 ESD

27 (R7FA4M1AB3CFM#AA0)

UNO R4 WiFi 采用Renesas®32位RA4M1微控制器 **R7FA4M1AB3CFM#AA0**，主频48 MHz，Arm® Cortex®-M4内核，包含浮点单元(FPU)。

RA4M1微控制器具有5 V兼容性和与Arduino UNO兼容的引脚分布。

R7FA4M1AB3CFM#AA0特性：

- 256kB Flash/32kB SRAM/8kB EEPROM
- RTC
- 4xDMA通道 (DMAC)
- 14xADC
- 12xDAC
- USB
- CAN

该微控制器与Renesas RA4M1兼容。

28 Wi-Fi® / ® ESP32-S3-MINI-1-N8

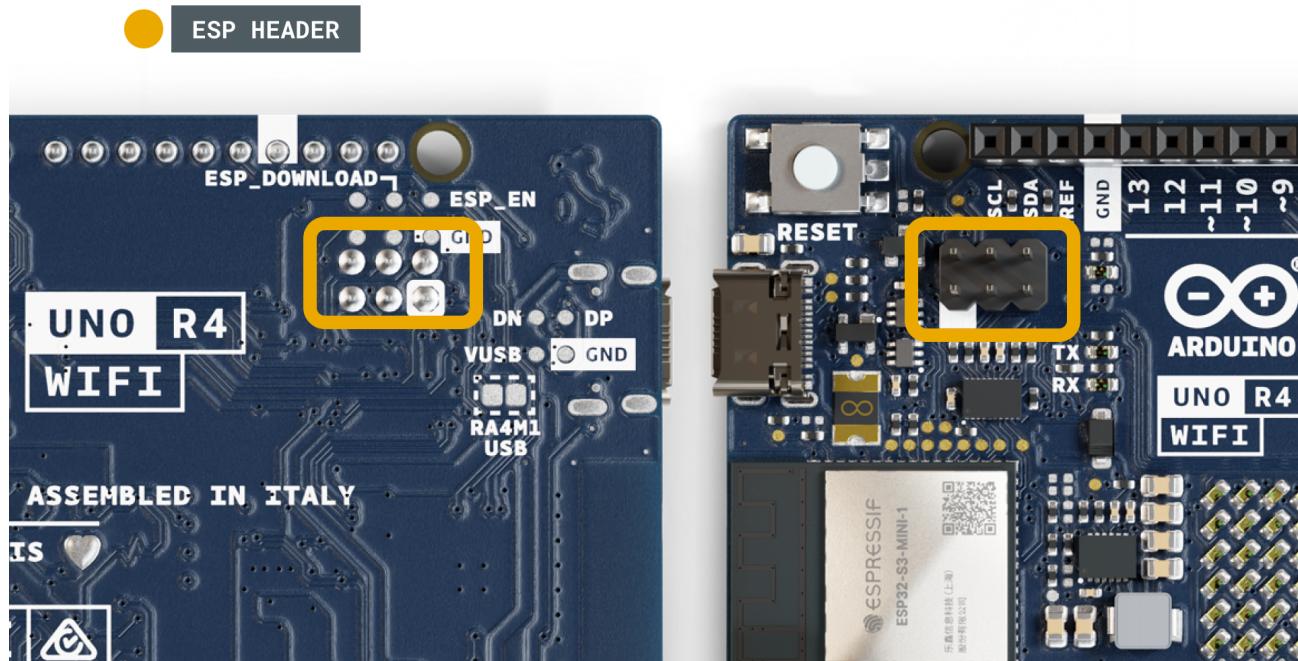
UNO R4 WiFi板上的Wi-Fi®/LE模块是ESP32-S3 SoC，基于Xtensa® LX7 MCU，主频2.4 GHz。

ESP32-S3-MINI-1-N8特性：

- Wi-Fi® 4 - 2.4 GHz
- LE 5
- 3.3V
- 384kB ROM
- 512kB SRAM
- 150 Mbps

该模块与UNO R4 WiFi板上的MCU兼容，可直接替换RA4M1 MCU。

28.1 ESP

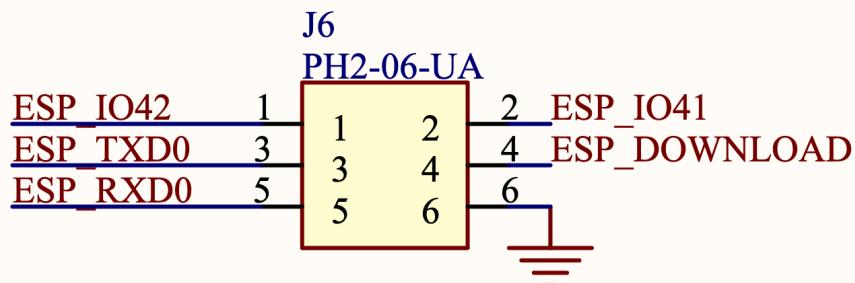


ESP32.

RESETESP32-S3

- ESP_I042 - MTMS 1
- ESP_I041 - MTDI 2
- ESP_RXD0 - RXUART 3
- ESP_DOWNLOAD - 4
- ESP_RXD0 - RXUART 5
- GND - 6

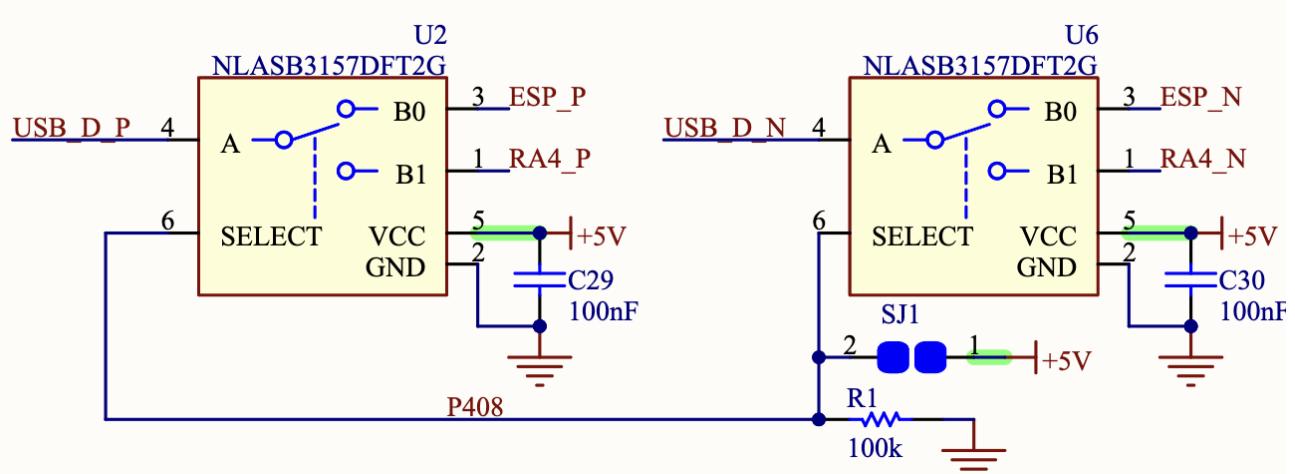
ESP HEADER



ESP 000000

28.2 USB

UNO R4 WiFiのUSB端子はRA4M1 MCUとESP32-S3によって構成されています。P408 "D"(D40)とU2 U6によってUSB端子が構成され、RA4M1 MCUによって制御されます。



SJ1はUSB端子とRA4M1 MCUとESP32-S3との間の接続点です。

29 USB

UNO R4 WiFi通过USB-C®连接到计算机以进行编程和调试。

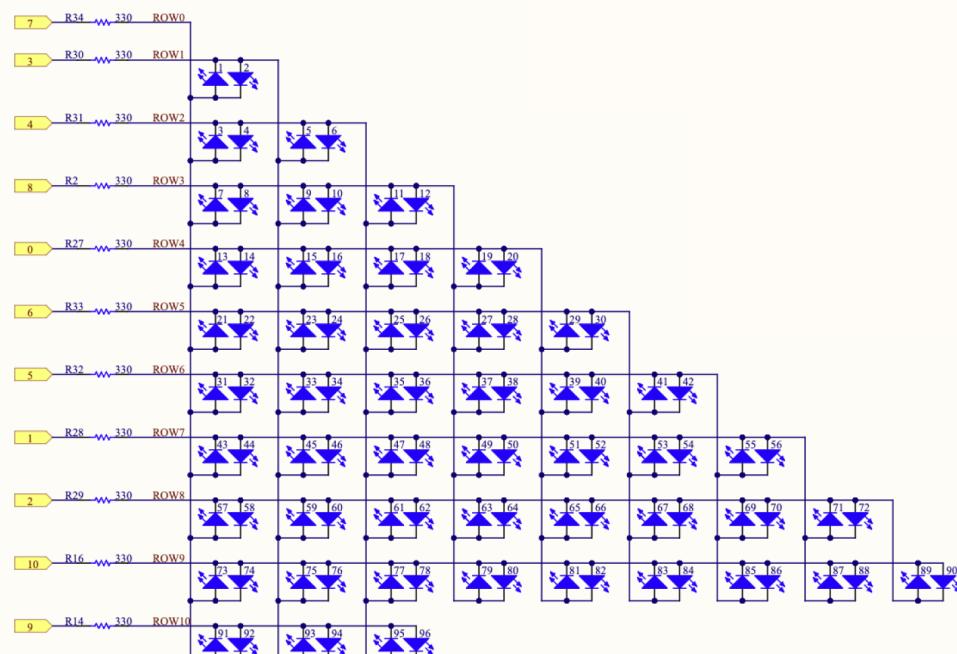
连接USB-C®端口时，请确保连接到5V引脚。

30 LED

UNO R4 WiFi有12x8个LED（U_LEDMATRIX）。

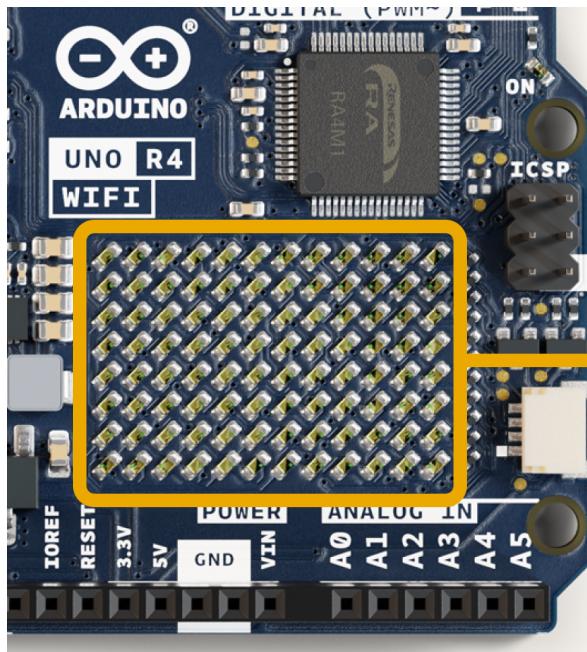
RA4M1 MCU控制这些LED。

- P003
- P004
- P011
- P012
- P013
- P015
- P204
- P205
- P206
- P212
- P213



LED矩阵

LED矩阵由RA4M1 MCU控制。



1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81	82	83	84
85	86	87	88	89	90	91	92	93	94	95	96

LED███████

██

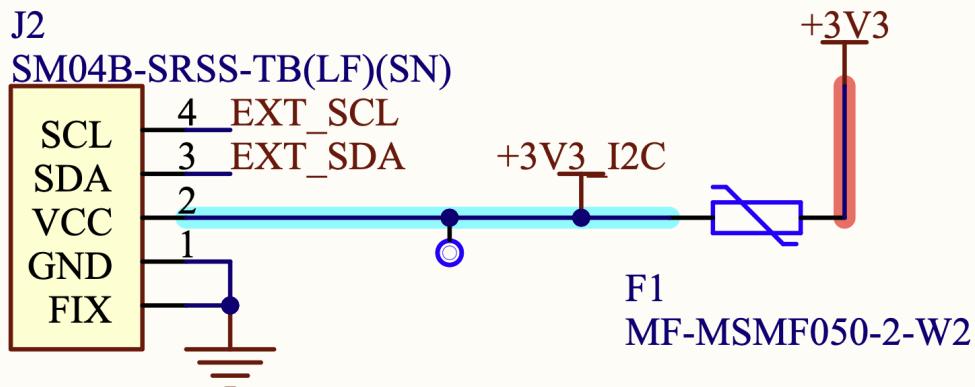
31 (DAC)

UNO R4 WiFi A0 A1 A2 A3 A4 A5 DAC DAC DAC DAC DAC DAC

DAC DAC DAC DAC DAC DAC DAC DAC DAC DAC DAC DAC

32 I2C

I2C端子SM04B-SRSS-TB(LF)(SN)と接続するI2C端子を3.3Vに接続



I2C端子。

ANALOG端子

JANALOG 端子

- A4
- A5

DIGITAL端子

- SDA
- SCL

A4/A5端子はI2C端子として機能し、ADC端子として機能するI2C端子です。

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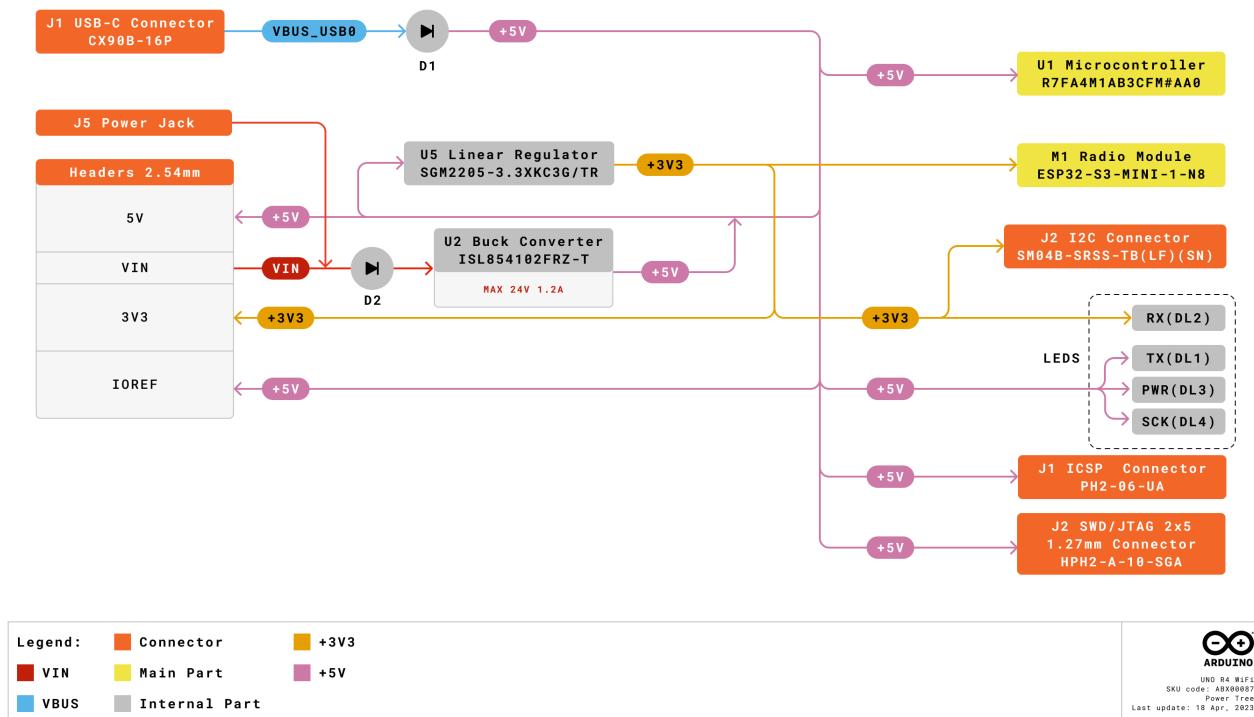
VIN → USB-C® → VBUS → ISL854102FRZ → 5V

VUSB → VIN → ISL854102FRZ → 5V

USB → RA4M1 MCU → ~4.7V

SGM2205-3.3XKC3G/TR → USB → 5V → ESP32-S3 → 3.3V

33.1



Arduino Uno R4 WiFi.

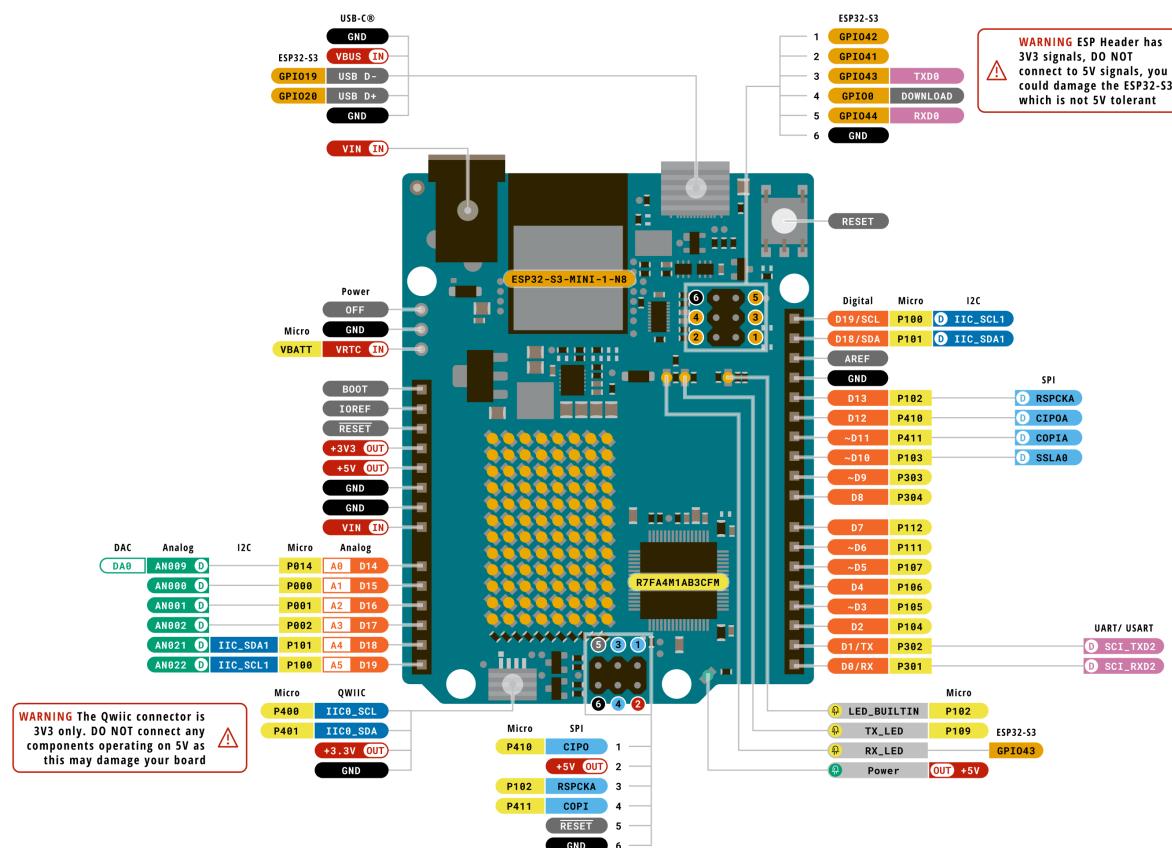


33.2

UNO R4 WiFi
5V
ESP32-S3
3.3V
RA4M1
5V
GND
3.3V
GND

33.3

R7FA4M1AB3CFM#AA0
GPIO
8mA
GPIO
GND



Legend:	Digital	I2C	Other SERIAL
Power	Analog	SPI	Analog
Ground	Main Part	UART/USART	PWM/Timer

UNO R4 WiFi Pinout
SKU code: ABX00087
Pinout Last update: 30 Jun, 2023



34.1

Pin	Name	Function	Description
1	BOOT	NC	
2	IOREF	IOREF	Internal reference voltage - 5 V
3	Reset	Reset	
4	+3V3		+3V3 pins
5	+5V		+5V pins
6	GND		GND pins
7	GND		GND pins
8	VIN		VIN pins
9	A0		Analog 0 / DAC
10	A1		Analog 1 / OPAMP+
11	A2		Analog 2 / OPAMP-
12	A3		Analog 3 / OPAMPOut
13	A4		Analog 4 / I2C SDA
14	A5		Analog 5 / I2C SCL (SCL)

34.2

Pin	Name	Function	Description
1	SCL		I2C SCL
2	SDA		I2C SDA
3	AREF		Reference
4	GND		GND
5	D13/SCK/CANRX0		GPIO 13 / SPI MISO / CAN RX (RX)
6	D12/CIPO		GPIO 12 / SPI MOSI
7	D11/COPI		GPIO 11 PWM / SPI SCK
8	D10/CS/CANTX0		GPIO 10 PWM / SPI MISO / CAN TX (TX)
9	D9		GPIO 9 (PWM~)
10	D8		GPIO 8
11	D7		GPIO 7
12	D6		GPIO 6 (PWM~)
13	D5		GPIO 5 (PWM~)
14	D4		GPIO 4
15	D3		GPIO 3 (PWM~) / MISO
16	D2		GPIO 2 / MISO
17	D1/TX0		GPIO 1 / M0 TX (TX)
18	D0/TX0		GPIO 0 / M0 TX (RX)

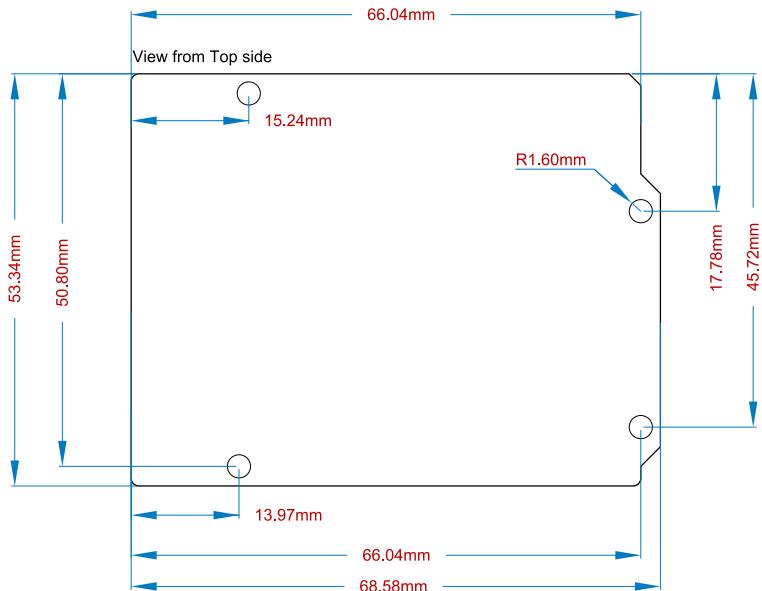
34.3

Pin	Name	Function	Notes
1	OFF		0000000
2	GND		00
1	VRTC		0000000 RTC 00

34.4 ICSP

Pin	Name	Function	Notes
1	CIPO		0000000000
2	+5V		5V 00
3	SCK		0000
4	COPI		0000000000
5	RESET		00
6	GND		00

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Arduino Uno R4 WiFi 0000000



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36.1 – IDE

Arduino UNO R4 WiFi Desktop IDE **[1]** Arduino UNO R4 WiFi Type-C® USB LED (DL1)

36.2 – Arduino Web Editor

Arduino Web Editor **[2]**

Arduino Web Editor [3]

36.3 – Arduino Cloud

Arduino Cloud Arduino IoT

36.4

Arduino Project Hub **[4]** Arduino Library Reference **[5]** **[6]**

36.5

Arduino USB USB

37 CE DoC EU

CE DoC EU EEA



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EU RoHS & REACH 211 01/19/2021

Arduino UNO R4 WiFi RoHS 2011/65/EU 2015/863/EU 2015/64/EC RoHS 3 2015/64/EC SVHCs
List

物质	限制(ppm)
铅 (Pb)	1000
镉 (Cd)	100
汞 (Hg)	1000
六价铬 (Cr6+)	1000
溴阻燃剂 (PBB)	1000
溴阻燃剂 (PBDE)	1000
邻苯二甲酸二丁酯 (DEHP)	1000
邻苯二甲酸二异丁酯 (BBP)	1000
邻苯二甲酸二辛酯 (DBP)	1000
邻苯二甲酸二壬基己酯 (DIBP)	1000

该表显示了Arduino UNO R4 WiFi产品中RoHS禁用物质的限制浓度。所有列出的物质浓度均不超过1000 ppm。

Arduino UNO R4 WiFi 符合 (EC) 1907 /2006 指令关于REACH (REACH) 管理的SVHCs (https://echa.europa.eu/web/guest/candidate-list-table)。根据该指令，任何浓度大于0.1%的物质在“候选”REACH 列表 XIV 中的 ECHA 网站上 1907 /2006/EC 指令第 XVII 条规定的 SVHCs。

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该页展示了Arduino UNO R4 WiFi产品的REACH SVHCs列表。根据 (EC) 1907 /2006 指令，以下物质被列为SVHCs：铅 (Pb)、镉 (Cd)、汞 (Hg)、六价铬 (Cr6+)、溴阻燃剂 (PBB)、溴阻燃剂 (PBDE)、邻苯二甲酸二丁酯 (DEHP)、邻苯二甲酸二异丁酯 (BBP)、邻苯二甲酸二辛酯 (DBP) 和邻苯二甲酸二壬基己酯 (DIBP)。这些物质的浓度均不超过1000 ppm。



40 FCC

遵守以下規範以符合 FCC 規定：

- (1) 遵守 FCC ID 15 CFR 2010 規定。
- (2) 遵守 RSS ID 2010 規定。

FCC ID 規定

1. 遵守 FCC ID 15 CFR 2010 規定。
2. 遵守 RSS ID 2010 規定。
3. 遵守 FCC ID 15 CFR 2010 規定 20 dB。

此裝置符合 FCC ID 15 CFR 2010 規定。B 級數位裝置可能會造成有害干擾，但不會保證不會發生。如果裝置確實造成有害干擾，使用者可能需要採取某些行動來減少干擾。

- 遵守 FCC ID 15 CFR 2010 規定。
- 遵守 RSS ID 2010 規定。
- 遵守 FCC ID 15 CFR 2010 規定 20 dB。
- 遵守 RSS ID 2010 規定。

English: User manuals for licence-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 licence-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 ne doit 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 規定

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

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.

溫度範圍 EUT: 85°C -40°C

Arduino S.r.l. 2014/53/EU 標準規範



41 SRRC

SRRC ID: CMIIT ID: 2022DP6085

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公司名称	Arduino SRL
地址	Via Andrea Appiani, 25 - 20900 MONZA (Italy)

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Ref	Link
Arduino IDE (Desktop)	https://www.arduino.cc/en/Main/Software
Arduino IDE (Cloud)	https://create.arduino.cc/editor
Cloud IDE Getting Started	https://docs.arduino.cc/cloud/web-editor/tutorials/getting-started/getting-started-web-editor
Project Hub	https://create.arduino.cc/projecthub?by=part&part_id=11332&sort=trending
Library Reference	https://github.com/arduino-libraries/
Online Store	https://store.arduino.cc/

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日期	** 项数 **	状态
19/09/2023	4	FCC ID
25/07/2023	3	EPA
30/06/2023	2	IC
08/06/2023	1	SRRC