Arduino UNO R4
Sales Brief

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Arduino UNO R4
Release: Early July 2023

The Arduino UNO R4 boards feature a powerful 32-bit microcontroller, providing increased processing power and memory, while still maintaining the standard UNO form factor and 5V operating voltage. As such, it is an excellent option for both novice and experienced electronics enthusiasts who wish to push the limits of their projects.

What Is The Arduino UNO R4?

While preserving the well-known features of the UNO family, the UNO R4 boards introduce a 32-bit architecture and exciting new features for makers.

The Arduino UNO R4 boards are equipped with a powerful 32-bit microcontroller from Renesas, which offers increased processing power, memory and on-board peripherals. Importantly, these enhancements do not compromise compatibility with existing shields and accessories, nor do they require any changes to the standard form factor or 5V operating voltage.

Thanks to its robust design and reliable performance, the UNO R4 is a valuable addition to the Arduino ecosystem. It is suitable for both beginners and experienced electronics enthusiasts who want to push the boundaries of their projects.

Value Proposition In A Nutshell

Building upon the success of the UNO R3, the UNO R4 boards are the best prototyping and learning tools for anyone.
While preserving the well-known features of the UNO family **(standard form factor, shield compatibility, 5V voltage, robustness)**, new features were added and a more affordable lightweight version was introduced to expand the offer.

The Arduino UNO R4 comes in two variants:

UNO R4 Minima (new features)

- USB-C connector
- RA4M1 from Renesas (Cortex M4)
- HID device (emulate a mouse or a keyboard)
- Improved power section (up to 24V through VIN)
- CAN bus
- DAC (12 bits)
- OP amp

UNO R4 WiFi (new features)

...everything that UNO R4 Minima has, plus:

– WiFi / Bluetooth Low Energy
– Fully-addressable LED matrix (12x8 matrix)
– Qwiic I2C connector
– RTC (with support for a buffer battery)
– Runtime errors diagnostics

Value Proposition Breakdown (both boards)

Customer need	Target	Boards	Values	Use Cases
Start learning electronics with a robust, easy-to-use, well-known and well documented board	Beginners	**R4 Minima, R4 WiFi**	– 5V – female pin headers – compatibility with the huge amount of examples/videos/books/projects based on the UNO R3 – runtime errors diagnostics	Learn Arduino; build something without coding from scratch; access third-party content.
Power the board at more than 12V	Experienced users	**R4 Minima, R4 WiFi**	UNO R4 supports up to 24V (few boards in the market support this)	Use a single power supply even in projects that need a higher voltage
Use more advanced features such as HID device, CAN, DAC, OPamp, RTC	Experienced users	**R4 Minima, R4 WiFi**	UNO R4 supports several more advanced features without the need for additional hardware	Develop more advanced projects; solve specific problems
Add more memory and speed to an existing project	Existing Arduino users	**R4 Minima, R4 WiFi**	– faster clock, more memory, more storage – compatibility with code and libraries written for UNO R3 – 5V – pinout compatibility with UNO R3	Improve an existing project that is resource constrained on an UNO R3 and needs a more powerful board to be extended in its capabilities.

Value Proposition Breakdown (board-specific)

Customer need	Target	Boards	Values	Use Cases
Add connectivity to an existing project	Existing Arduino users	**R4 WiFi**	WiFi / BLE	Collect data in a cloud dashboard; control the project remotely; perform Over-the-Air sketch updates; get data from remote APIs
Upgrade an existing project based on UNO WiFI rev2	Existing users of UNO WiFi rev2	**R4 WiFi**	– compatibility with code and libraries written for UNO R3 – built-in WiFi support	Improve or expand an existing project that is resource constrained by the UNO WiFi rev2 which is very limited for connected projects.
A board that does not need extra components to make something	New Arduino users	**R4 WiFi**	– Built-in LED matrix	Create text slideshows and animations with the LED matrix just after unboxing the product
Create projects easily without breadboards, soldering or manual wiring	New/Existing Arduino users	**R4 WiFi**	– vast ecosystem of shields – Qwiic port to add multiple chained I2C nodes	Connect multiple plug-and-play sensors and actuators commonly available in the market; combine them with shields.
Get an Arduino UNO at a lower price	Price-sensitive new Arduino users, students	**R4 Minima**	– lower price than UNO R3	Build a project that does not need all the features of the UNO R4 WiFi but still leverages an official Arduino board.

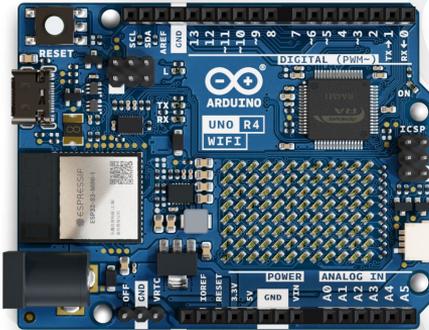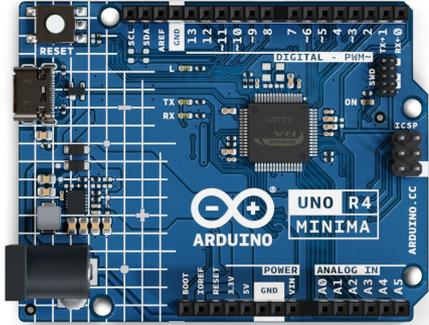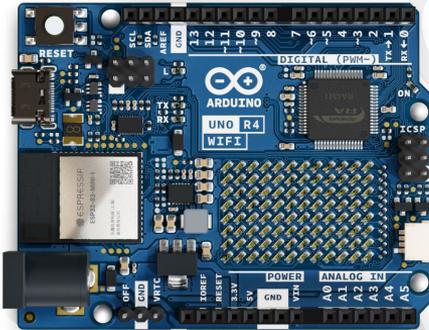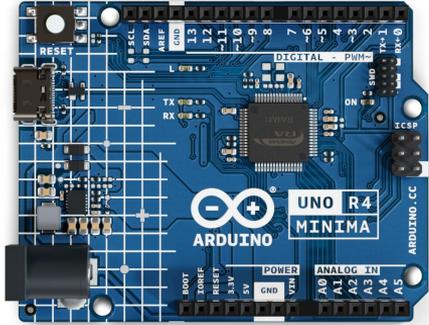# Arduino UNO R4
Features And Benefits

Tech specs

		UNO R4 Minima	UNO R4 WiFi
MCU	[R7FA4M1AB3CFM#AA0](#) (Arm cortex M4)	✔	✔
Memory	256KB Flash / 32KB SRAM	✔	✔
Operating voltage	5V	✔	✔
Input voltage	6-24V	✔	✔
Clock speed	48 MHz	✔	✔
Programming port	USB-C	✔	✔
WiFi/BLE	ESP32-S3-MINI		✔
LED Matrix	12x8 (96 red LEDs)		✔
Additional connections	● Qwiic connector ● OFF pin ● VRTC pin		✔

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Pinout

		UNO R4 Minima	UNO R4 WiFi
Digital pins	14	✔	✔
PWM	6	✔	✔
ADC	6	✔	✔
DAC	1 (12 bit)	✔	✔
SPI	1	✔	✔
I2C	1	✔	✔
CAN	1	✔	✔

Features (both boards) - 1/2

– Hardware backwards compatibility
The UNO R4 maintains the same pinout and 5V operating voltage as its predecessor, the Arduino UNO R3. This means that existing shields and projects will can be easily ported to the new board.

– New on-board peripherals
The UNO R4 features several exciting new peripherals, including a 12-bit DAC, CAN BUS, OP AMP, and SWD port. These additions expand the possibilities for makers and allow for more advanced projects.

– More memory and faster clock
With increased memory (16x) and a faster clock speed (3x), the UNO R4 Minima can perform more precise calculations and handle more complex projects. This enables makers to build even more sophisticated and advanced projects.

– HID over USB-C
The UNO R4 allows to simulate a mouse or keyboard when connected to its USB-C port. This feature enables makers to create quick and cool interfaces with minimal effort.
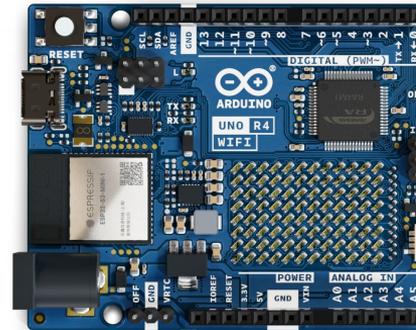
Features (both boards) - 2/2

– Larger voltage range and electrical robustness
The UNO R4 boards can be powered up to 24V, also thanks to an enhanced themal design. The circuit is designed with several protections in place to decrease the chances that wiring mistakes done by inexperienced users may damage the board or the PC. Also, the RA4M1 microcontroller has overcurrent protection on the pins which provides additional protection from mistakes.

– Capacitive touch support
The RA4M1 microcontroller used on UNO R4 boards supports capacitive touch natively.
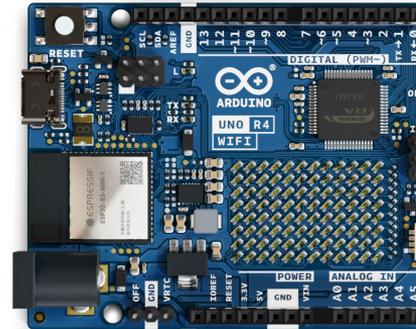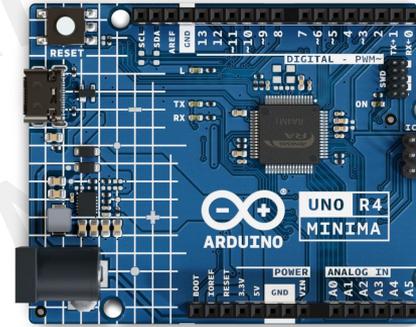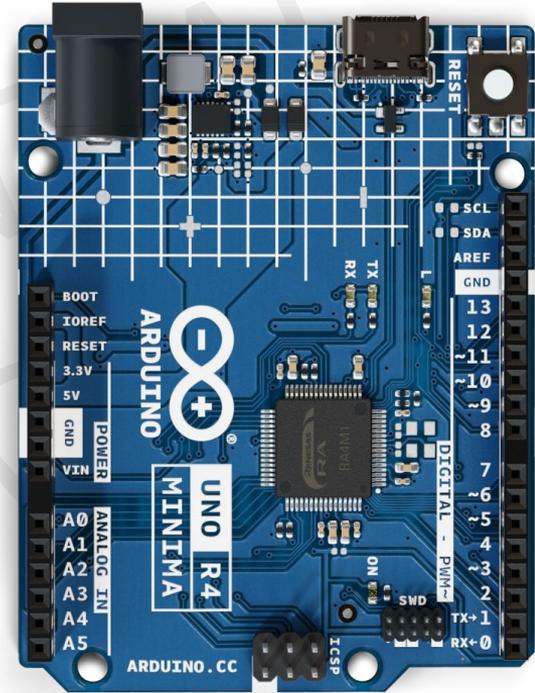
Features (UNO R4 Minima)

– Powerful and affordable
The UNO R4 Minima offers impressive performance at a competitive price point. This board is a particularly affordable option, consolidating Arduino's commitment to making high-end technology accessible to everyone.

– SWD pins for debugging
The on-board SWD port provides a simple and reliable way for makers to connect third-party debugging probes. This feature ensures that projects are more reliable and allows for efficient debugging of any potential issues.

Features (UNO R4 WiFi)

– WiFi and Bluetooth capabilities
The UNO R4 WiFi features an ESP32-S3-MINI coprocessor that enhances the capabilities of the RA4M1 microcontroller. With WiFi and Bluetooth connectivity, this board allows makers to easily connect to the internet and create IoT projects.

– 12x8 on-board LED matrix
The UNO R4 WiFi includes a bright 12x8 red LED matrix (96 dots total). This feature is ideal for creative projects using animations or for plotting sensor data, without the need for any additional hardware.

– Qwiic I2C connector
The UNO R4 WiFi includes an industry-standard Qwiic I2C connector that facilitates quick prototyping. With a wide variety of compatible modules that can be connected over I2C, makers can easily create custom projects and expand the capabilities of the UNO R4 WiFi.

– Diagnostics for runtime errors
The UNO R4 WiFi features a built-in error-catching mechanism that detects operations that can cause the board to crash, such as division by zero. When an error is detected, the board prints a detailed explanation of the error and its causes on the serial monitor.
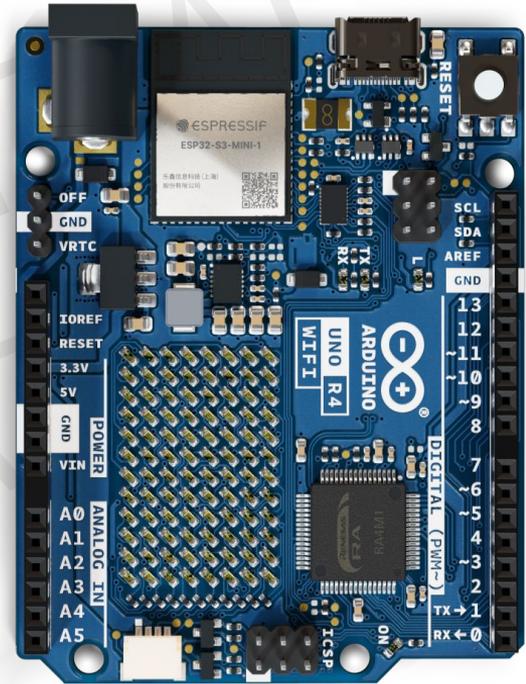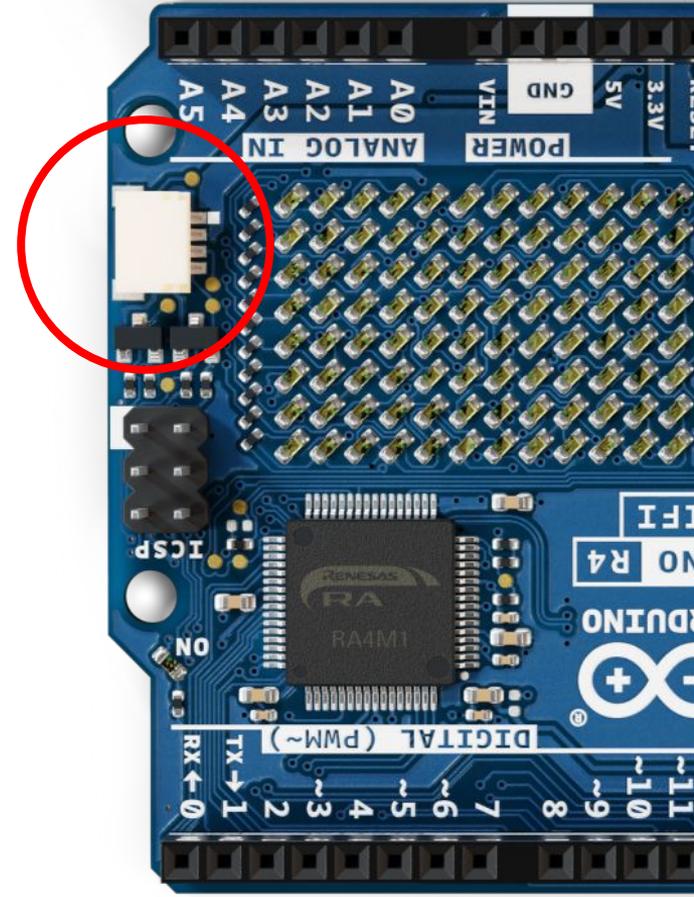
Arduino UNO R4
Ecosystem

Shields + Qwiic nodes = plug-and-play experience

The UNO R4 WiFi features a **Qwiic I2C connector** that allows users to connect one or multiple nodes chosen from the huge Qwiic ecosystem already available on the market. With simple adapter cables, sensors and actuators based on other connectors such as Grove can be connected too.

In combination with the well-known ecosystem of shields for Arduino UNO, the UNO R4 WiFi becomes the most versatile platform to **create projects without the need for a breadboard or soldering**.

Makers are now able to pick any combination of shields + I2C nodes and generate ideas for new projects. This possibility opens up to bundles and commercial promotions based on such plug-and-play combinations.

Arduino shields ecosystem

– Arduino shields for UNO
All the existing shields for UNO manufactured by Arduino are 100% compatible with UNO R4.

– Third-party shields for UNO
The ecosystem of third-party shields for UNO is huge and counts 100+ products on the market. In terms of voltage and pinout, all the shields are compatible with UNO R4. Software compatibility might require some porting work, so it should be checked with shield manufacturers before purchase.
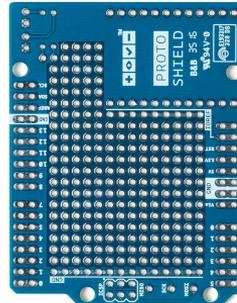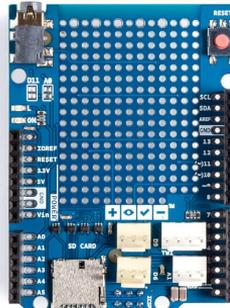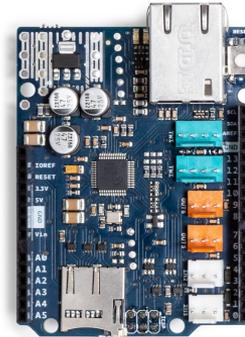

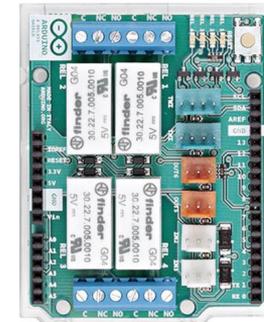**Proto Shield Rev3**
(TSX00083)

Motor Shield Rev3
(A000079)
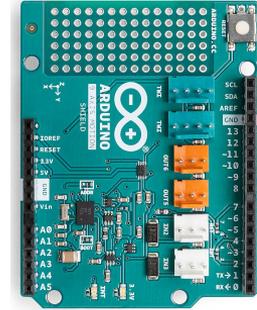
9 Axis Motion Shield
(A000070)

Education Shield
(TSX00006)

Ethernet Shield 2
(A000024)

4 Relays Shield
(A000110)

Arduino UNO R4
## Pricing And Positioning

Markets and positioning

	UNO R4 Minima	UNO R4 WiFi
Makers	**Affordable and powerful, the Arduino UNO R4 Minima is the best first step to become a maker.**	**A complete platform to quickly prototype your next IoT projects. Focus on your idea, the Arduino UNO WiFi has everything you need.**
Education	An affordable and accessible option for educators looking to include Arduino in their curriculum.	The UNO R4 WiFi has everything from basic to IoT projects, making it an ideal choice for classroom use. With the Qwiic connector, educators can focus on teaching code instead of wiring and soldering.
Professional	An accessible and robust way to prototype projects based on the Renesas RA4M1 microcontrollers.	An accessible and robust way to prototype projects with IoT connectivity, CAN and more.

Pricing (UNO R4 Minima)

To accelerate the adoption of UNO R4 boards, we are going to launch them at a very competitive price.
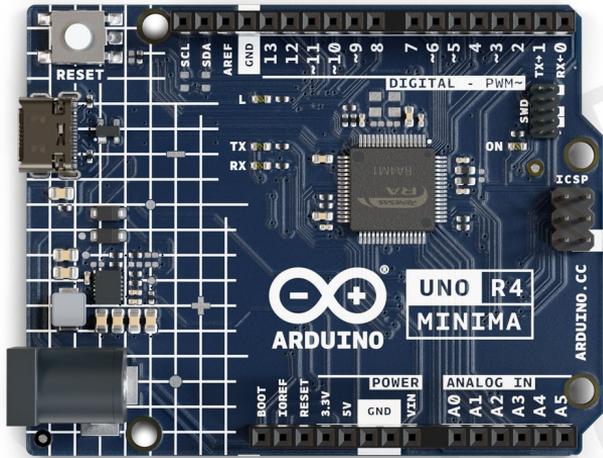
Name: Arduino UNO R4 Minima
Brand: Arduino Maker

SKU: ABX00080

MSRP: €18 / $20

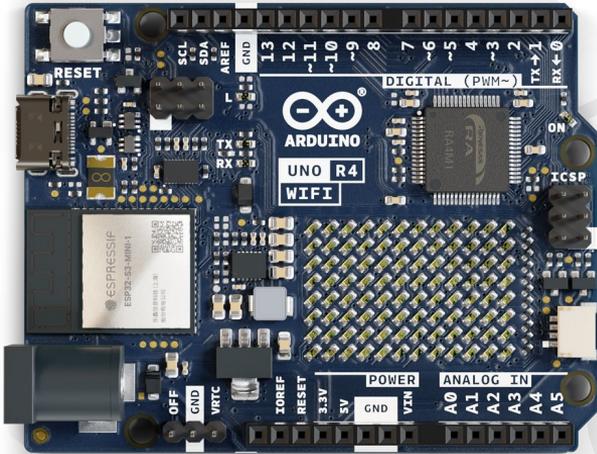**CONFIDENTIAL**

Availability: Early July 2023

Cross Sell: Bundle with the Arduino Proto Shield Rev3 (Uno Size) (TSX00083), Arduino Motor Shield Rev3 (A000079), Arduino 9 Axis Motion Shield (A000070), Arduino Education Shield (TSX00006), Arduino Ethernet Shield 2 (A000024), Arduino 4 Relays Shield (A000110). *3rd party UNO shields are compatible electrically but software support must be checked with manufacturers.*

Pricing (UNO R4 WiFi)

To accelerate the adoption of UNO R4 boards, we are going to launch them at a very competitive price.

Name: Arduino UNO R4 WiFi
Brand: Arduino Maker

SKU: ABX00087

CONFIDENTIAL

MSRP: €25 / $27.50

Availability: Early July 2023

Cross Sell: Bundle with the Arduino Proto Shield Rev3 (Uno Size) (TSX00083), Arduino Motor Shield Rev3 (A000079), Arduino 9 Axis Motion Shield (A000070), Arduino Education Shield (TSX00006), Arduino Ethernet Shield 2 (A000024), Arduino 4 Relays Shield (A000110). *3rd party UNO shields and Qwiic modules are compatible electrically but software support must be checked with manufacturers.*

IMPORTANT: The Arduino UNO R3 is <u>not being discontinued</u>

With over 10 million UNOs sold worldwide and thousands of UNO projects available online for users to try, **the UNO R3 will still be available with no plans of deprecation of discontinuation**.

Based upon past history we expect end customer demand for the R3 to remain strong, as **the introduction of more powerful products has had the effect of increasing the market share rather than replacing sales of core products**.

In fact, we still see healthy sales of the classic Arduino Nano despite the Nano family has grown to include cheaper, more powerful options such as the Arduino Nano Every (classic Nano to Nano Every sales ratio is still 40% / 60% after 3 years from its introduction). This is due to the legacy of the huge availability of projects and learning material that is based on classic products.
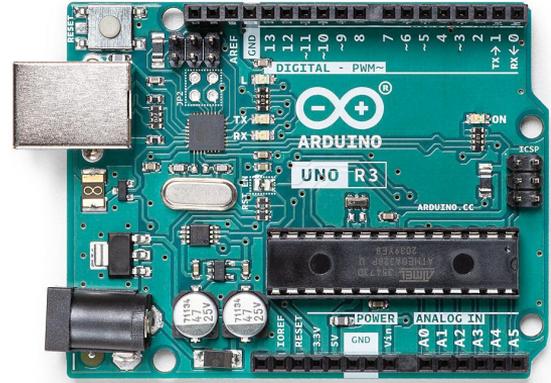
That's a wrap
Thank you!

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