

Description

Arduino® UNO एक R4 Minima is the first UNO board to feature a 32-bit microcontroller. It features a RA4M1 series microcontroller from Renesas (R7FA4M1AB3CFM#AA0), which embeds a 48 MHz Arm® Cortex®-M4 microprocessor. The UNO एक R4 Minima's memory is larger than its predecessors, with 256 kB flash, 32 kB SRAM and 8 kB data memory (EEPROM).

This product was created, manufactured and distributed exclusively for the Indian Market as the **Arduino UNO एक R4 Minima** (SKU: ABX00080_IN), being technically compatible with the international version **Arduino® UNO R4 Minima** (SKU: ABX00080).

Target areas:

Maker, beginner, education

Features

- **R7FA4M1AB3CFM#AA0**
 - 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 Analog Converter (DAC)
- **Memory**
 - 256 kB Flash Memory
 - 32 kB SRAM
 - 8 kB Data Memory (EEPROM)
- **Pins**
 - 14x digital pins (GPIO), D0-D13
 - 6x analog input pins (ADC), A0-A5
 - 6x PWM pins: D3,D5,D6,D9,D10,D11
- **Peripherals**
 - Capacitive Touch Sensing Unit (CTSU)
 - USB 2.0 Full-Speed Module (USBFS)
 - up to 14-bit ADC
 - up to 12-bit DAC
 - Operational Amplifier (OPAMP)
- **Power**
 - Recommended input voltage (VIN) is 6-24 V
 - 5 V operating voltage
 - Barrel jack connected to VIN pin
 - Power via USB-C® at 5 V
 - Schottky diodes for overvoltage and reverse polarity protection
- **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)



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1 The Board

1.1 Application Examples

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

The board features the standard 14 digital I/O ports, 6 analog channels, dedicated pins for I2C, SPI and UART connections. Compared to its predecessors the board has a much larger memory: 8 times more flash memory (256 kB) and 16 times more SRAM (32 kB).

Entry level projects: If this is your first project within coding and electronics, the UNO एक R4 Minima is a good fit. It is easy to get started with and has a lot of online documentation (both official + third party).

Easy power management: the UNO एक R4 Minima has a barrel jack connector and supports input voltages from 6-24 V. This connector is widely popular and removes the need for additional circuitry required to step down the voltage.

Cross compatibility: the UNO form factor automatically makes it compatible with hundreds of existing third-party shields and other accessories.

1.2 Related Products

- Arduino UNO R3
- Arduino UNO R3 SMD
- Arduino UNO एक R4 WiFi



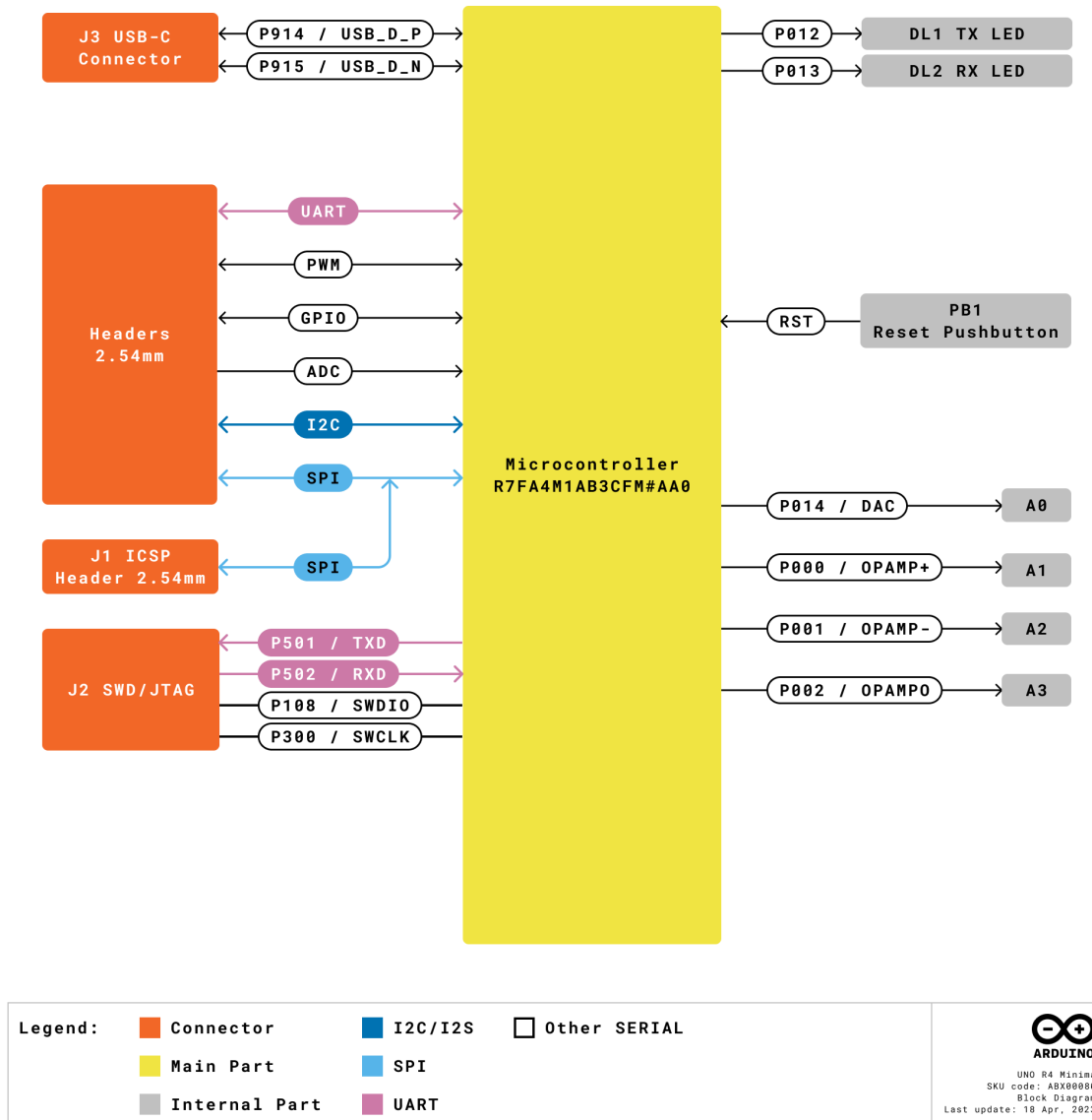
Rating

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

Functional Overview

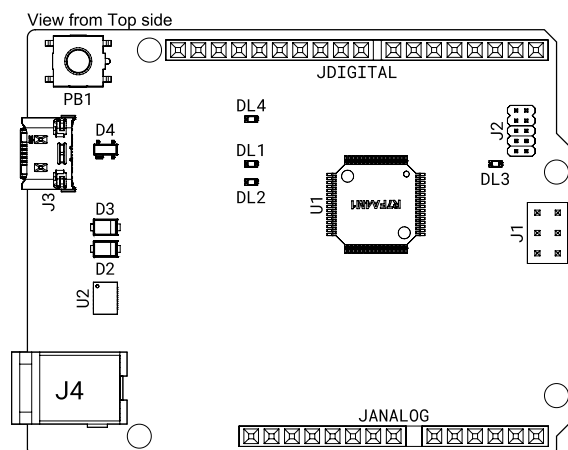
3 Block Diagram



Arduino® UNO एक R4 Minima Block Diagram

4 Board Topology

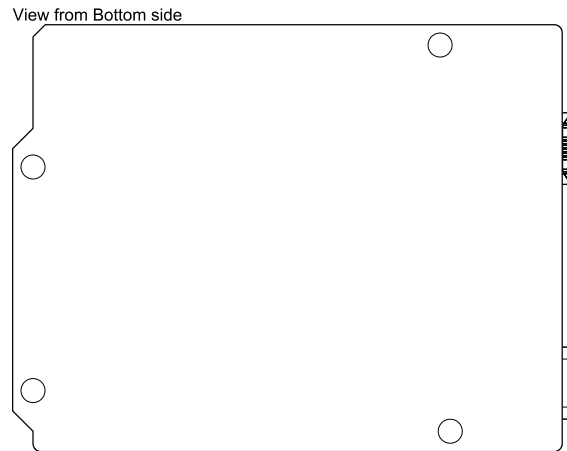
4.1 Front View



Top View of Arduino® UNO एक R4 Minima

Ref.	Description	Ref.	Description
U1	R7FA4M1AB3CFM#AA0 Microcontroller IC	J4	DC Jack
U2	ISL854102FRZ-T Buck Converter	DL1	LED TX (serial transmit)
PB1	RESET Button	DL2	LED RX (serial receive)
JANALOG	Analog input/output headers	DL3	LED Power
JDIGITAL	Digital input/output headers	DL4	LED SCK (serial clock)
J1	ICSP header (SPI)	D2	PMEG6020AELRX Schottky Diode
J2	SWD/JTAG Connector	D3	PMEG6020AELRX Schottky Diode
J3	CX90B-16P USB-C® connector	D4	PRTR5V0U2X,215 ESD Protection

4.2 Back View



Back View of Arduino® UNO एक R4 Minima

5 Microcontroller (R7FA4M1AB3CFM#AA0)

The UNO एक R4 Minima 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).

On the UNO एक R4 Minima, the operating voltage is fixed at 5 V to be fully retro compatible with shields, accessories & circuits originally designed for older UNO revisions.

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)
- up to 14-bit ADC
- up to 12-bit DAC
- OPAMP
- 1x CAN bus

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

6 USB Connector

The UNO एक R4 Minima has one USB-C® port, used to power and program your board as well as send & receive serial communication.

Note: You should not power the board with more than 5 V via the USB-C® port.

7 Digital Analog Converter (DAC)

The UNO एक R4 Minima 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.

8 Rated Current

Min	Typ	Max	Notes
29.71	33.39	36.98	Average current consumption while powered with USB-C and running the default firmware shipped with the board (blink).

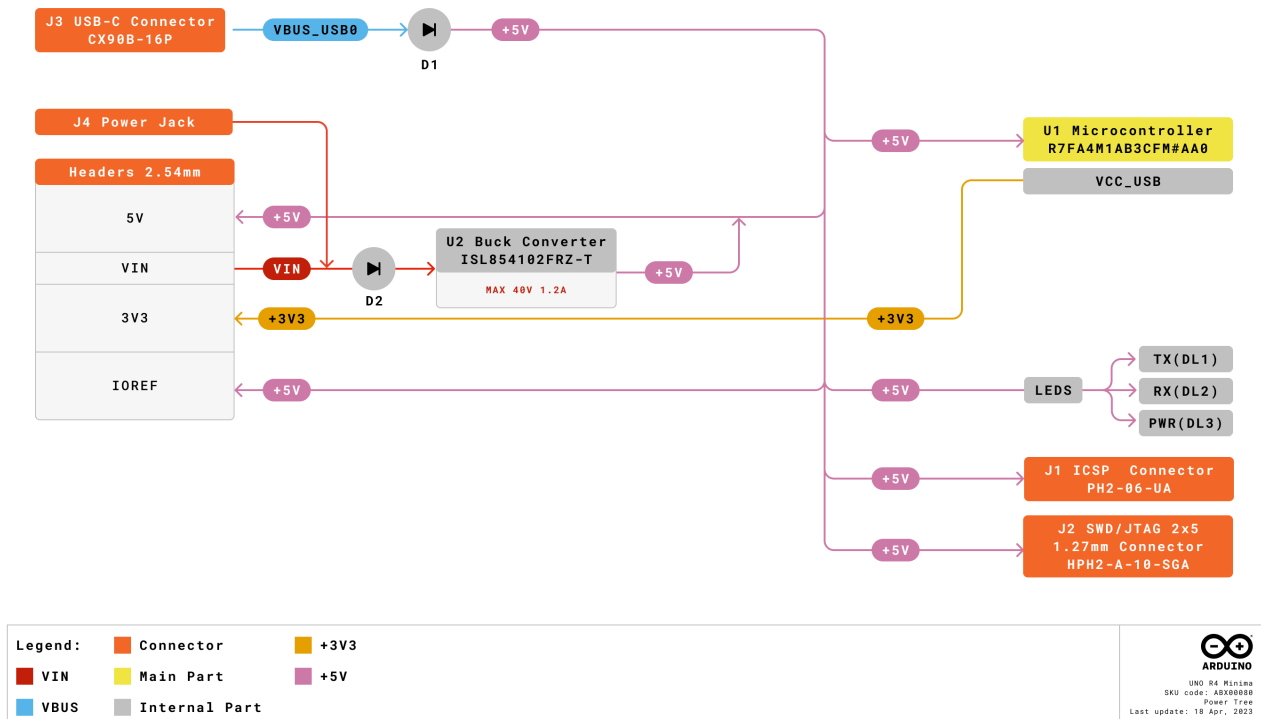
9 Power Options

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

The VUSB, barrel jack connector 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 microcontroller.

9.1 Power Tree



Arduino® UNO एक R4 Minima power tree.

9.2 Pin Voltage

The UNO एक R4 Minima operates on 5 V, as does all pins on this board except for the **3.3V pin**. This pin draws power from the VCC_USB pin on the R7FA4M1AB3CFM#AA0, and is not connected to the buck converter.

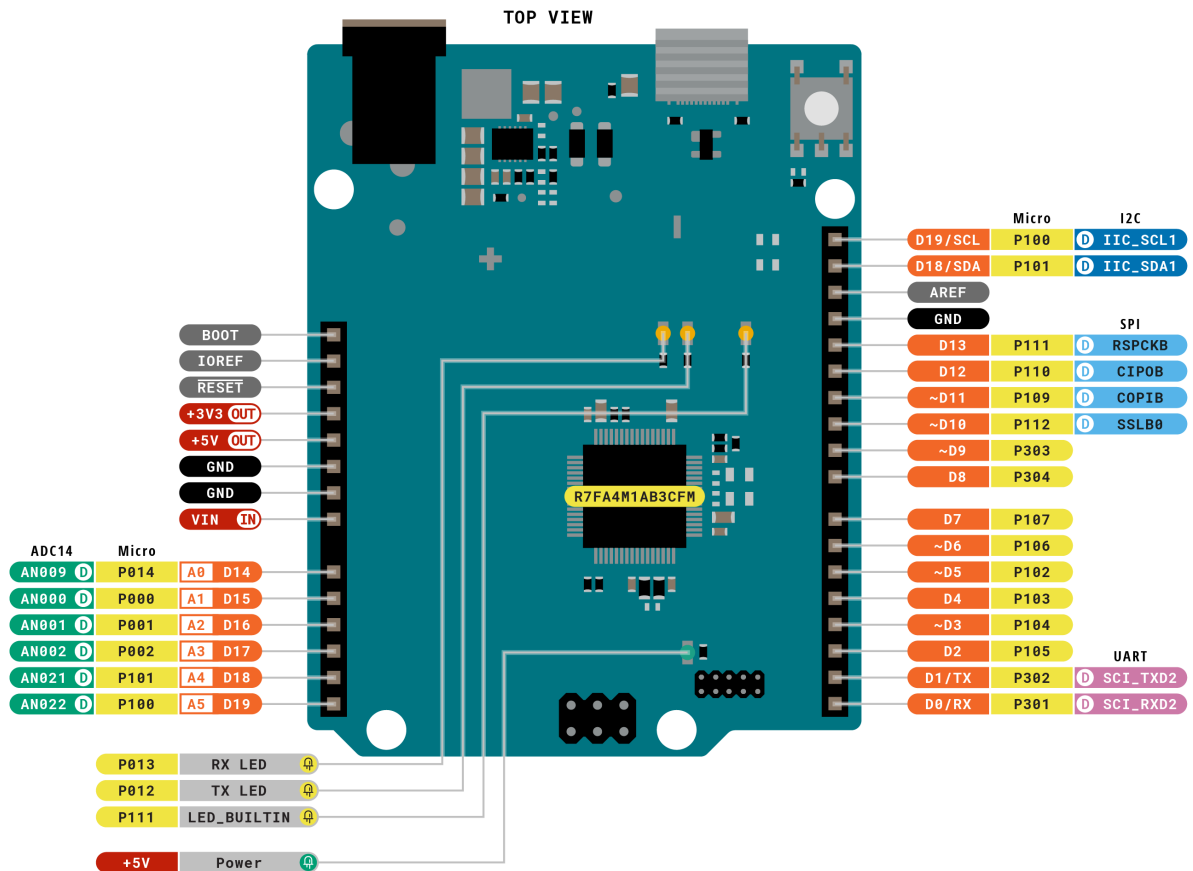
9.3 Pin Current

The GPIOs on the R7FA4M1AB3CFM#AA0 microcontroller can handle up to **8 mA**. Never connect devices that draw higher current directly to a GPIO.

In case you need to power external devices that require more power, e.g. servo motors, use an external power supply.

Mechanical Information

10 Pinout



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

ARDUINO

ARDUINO UNO R4 MINIMA

SKU code: ABX00080

Pinout

Last update: 16 Jun, 2023

Pinout for UNO एक R4 Minima.

10.1 Analog

Pin	Function	Type	Description
1	BOOT	MD	Mode selection
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 / I ² C Serial Data (SDA)
14	A5	Analog	Analog input 5 / I ² C Serial Clock (SCL)

10.2 Digital

Pin	Function	Type	Description
1	SCL	Digital	I ² C Serial Clock (SCL)
2	SDA	Digital	I ² C Serial Data (SDA)
3	AREF	Digital	Analog Reference Voltage
4	GND	Power	Ground
5	D13/SCK	Digital	GPIO 13 / SPI Clock
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	Digital	GPIO 10 (PWM) / SPI Chip Select
9	D9	Digital	GPIO 9 (PWM~)
10	D8	Digital	GPIO 8
11	D7	Digital	GPIO 7
12	D6	Digital	GPIO 6 (PWM~)
13	D5/CANRX0	Digital	GPIO 5 (PWM~) / CAN Transmitter (TX)
14	D4/CANTX0	Digital	GPIO 4 / CAN Receiver (RX)
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)

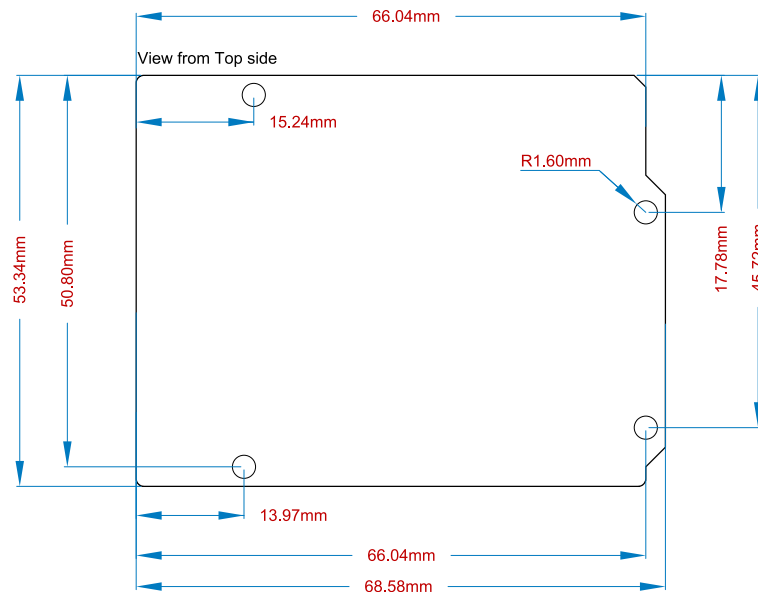
10.3 ICSP

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

10.4 SWD/JTAG

Pin	Function	Type	Description
1	+5V	Internal	Power Supply of 5 V
2	SWDIO	Internal	Data I/O pin
3	GND	Internal	Ground
4	SWCLK	Internal	Clock Pin
5	GND	Internal	Ground
6	NC	Internal	Not connected
7	RX	Internal	Serial Receiver
8	TX	Internal	Serial Transmitter
9	GND	Internal	Ground
10	NC	Internal	Not connected

11 Mounting Holes And Board Outline



Mechanical View of Arduino® UNO एक R4 Minima

12 Board Operation

12.1 Getting Started - IDE

If you want to program your UNO एक R4 Minima while offline you need to install the Arduino® Desktop IDE [1]. To connect the UNO एक R4 Minima 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).



12.2 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 sketches onto your board.

12.3 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.

12.4 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 exciting 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.

12.5 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.

Company Information

Company name	Arduino S.r.l.
Company Address	Via Andrea Appiani, 25 - 20900 MONZA (Italy)

Reference Documentation

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



Change Log

Date	Revision	Changes
23/01/2025	1	First Release based on Uno Minima revision 4