

Arduino MKR1000 & Genuino MKR1000

MKR1000 is a powerful board that combines the functionality of the Zero and the Wi-Fi Shield. It is the ideal solution for makers wanting to design IoT projects with minimal previous experience in networking.

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Overview

3.3V

32-bit

48 MHz

ARM Core

WIRELESS

Arduino MKR1000 has been designed to offer a practical and cost effective solution for makers seeking to add Wi-Fi connectivity to their projects with minimal previous experience in networking.

It is based on the Atmel [ATSAMW25](#) SoC (System on Chip), that is part of the SmartConnect family of Atmel Wireless devices, specifically designed for IoT projects and devices.

The ATSAMW25 is composed of three main blocks:

- SAMD21 Cortex-M0+ 32bit low power ARM MCU
- WINC1500 low power 2.4GHz IEEE® 802.11 b/g/n Wi-Fi
- ECC508 CryptoAuthentication

The ATSAMW25 includes also a single 1x1 stream PCB Antenna.

The design includes a Li-Po charging circuit that allows the Arduino/Genuino MKR1000 to run on battery power or external 5V, charging the Li-Po battery while running on external power. Switching from one source to the other is done automatically.

A good 32 bit computational power similar to [the Zero board](#), the usual rich set of I/O interfaces, low power Wi-Fi with a Cryptochip for secure communication, and the ease of use of the Arduino Software (IDE) for code development and programming. All these features make this board the preferred choice for the emerging IoT battery-powered projects in a compact form factor.

The USB port can be used to supply power (5V) to the board.

The Arduino/Genuino MKR1000 is able to run with or without the Li-Po battery connected and has limited power consumption.

The Arduino/Genuino MKR1000 Wifi module supports certificate SHA-256.

Warning: Unlike most Arduino & Genuino boards, the MKR1000 runs at 3.3V. The maximum voltage that the I/O pins can tolerate is 3.3V. Applying voltages higher than 3.3V to any I/O pin could damage the board. While output to 5V digital devices is possible, bidirectional communication with 5V devices needs proper level shifting.

You can find [here](#) your board warranty informations.

Getting Started

You can find in the [Getting Started section](#) all the information you need to configure your board, use the [Arduino Software \(IDE\)](#), and start tinker with coding and electronics. Full details and examples on how to use the WiFi interface are available in the [WiFi101 Library reference page](#).

Need Help?

- On the Software [on the Arduino Forum](#)
- On Projects [on the Arduino Forum](#)
- On the Product itself through [our Customer Support](#)

Get inspired

Discover some Arduino MKR1000 & Genuino MKR1000 projects featured from [Arduino Project Hub](#), our tutorial platform:



Smart Thermostat

Project tutorial by [Arduino_Genuino](#)

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One Button to Rule Them All

Project tutorial by [Arduino_Genuino](#)

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Wifi-Controlled Precision Camera Slider

Project showcase by [Ben Brandt](#)

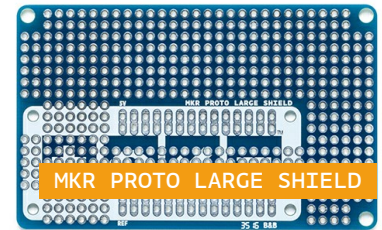
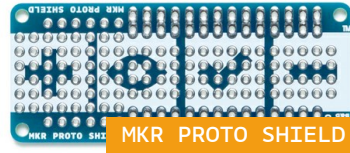
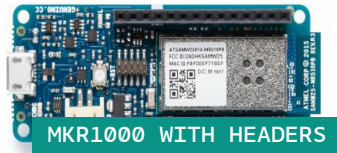


FizViz - Large Scale Physical Visualizations for your Stats!

Project tutorial by [Team IoT Design Shop](#)

Related Items

The Arduino and Genuino family is so big! Check MKR1000 related items and add them to your maker toolbox!



Technical specs

Microcontroller	SAMD21 Cortex-M0+ 32bit low power ARM MCU
Board Power Supply (USB/VIN)	5V
Supported Battery(*)	Li-Po single cell, 3.7V, 700mAh minimum
Circuit Operating Voltage	3.3V
Digital I/O Pins	8
PWM Pins	12 (0, 1, 2, 3, 4, 5, 6, 7, 8, 10, A3 - or 18 -, A4 -or 19)
UART	1
SPI	1
I2C	1
Analog Input Pins	7 (ADC 8/10/12 bit)
Analog Output Pins	1 (DAC 10 bit)
External Interrupts	8 (0, 1, 4, 5, 6, 7, 8, A1 -or 16-, A2 - or 17)
DC Current per I/O Pin	7 mA
Flash Memory	256 KB
SRAM	32 KB
EEPROM	no
Clock Speed	32.768 kHz (RTC), 48 MHz
LED_BUILTIN	6
Full-Speed USB Device and embedded Host	
LED_BUILTIN	6
Lenght	61.5 mm
Width	25 mm
Weight	32 gr.

Documentation

OSH: Schematics

The MKR1000 is open-source hardware! You can build your own board using the following files:





Pinout

[Download the pinout](#) in PNG format

Li-Po batteries, Pins and board LEDs

Battery capacity

Li-Po batteries are charged up to 4,2V with a current that is usually half of the nominal capacity (C/2). For Arduino / Genuino MKR1000 we use a specialized chip that has a preset charging current of 350mAh. This means that the MINIMUM capacity of the Li-Po battery should be 700 mAh. Smaller cells will be damaged by this current and may overheat, develop internal gasses and explode, setting on fire the surroundings. We strongly recommend that you select a Li-Po battery of at least 700mAh capacity. A bigger cell will take more time to charge, but won't be harmed or overheated. The chip is programmed with 4 hours of charging time, then it goes into automatic sleep mode. This will limit the amount of charge to max 1400 mAh per charging round.

Battery connector

If you want to connect a battery to your MKR1000 be sure to search one with female 2 pin JST PHR2 Type connector.

Polarity : looking at the board connector pins, polarity is Left = Positive, Right = GND

Download here the [Connector datasheet](#). On the MKR1000, connector is a Male 2pin JST PH Type.

Vin

This pin can be used to power the board with a regulated 5V source. If the power is fed through this pin, the USB power source is disconnected. This is the only way you can supply 5v (range is 5V to maximum 6V) to the board not using USB. This pin is an INPUT.

5V

This pin outputs 5V from the the board when powered from the USB connector or from the VIN pin of the board. It is unregulated and the voltage is taken directly from the inputs. When powered from battery it supplies around 3.7 V. As an OUTPUT, it should not be used as an input pin to power the board.

VCC

This pin outputs 3.3V through the on-board voltage regulator. This voltage is the same regardless the power source used (USB, Vin and Battery).

LED ON

This LED is connected to the 5V input from either USB or VIN. It is not connected to the battery power. This means that it lits up when power is from USB or VIN, but stays off when the board is running on battery power. This maximizes the usage of the energy stored in the battery. It is therefore normal to have the board properly running on battery power without the LED ON being lit.

CHARGE LED

The CHARGE LED on the board is driven by the charger chip that monitors the current drawn by the Li-Po battery while charging. Usually it will lit up when the board gets 5V from VIN or USB and the chip starts charging the Li-Po battery connected to the JST connector.

There are several occasions where this LED will start to blink at a frequency of about 2Hz. This flashing is caused by the following conditions maintained for a long time (from 20 to 70 minutes):

- No battery is connected to JST connector.
- Overdischarged/damaged battery is connected. It can't be recharged.
- A fully charged battery is put through another unnecessary charging cycle. This is done disconnecting and reconnecting either VIN or the battery itself while VIN is connected.

On MKR1000 the onboard LED is connected to **D6** and not D13 as on the other boards. Blink example or other sketches that uses pin 13 for onboard LED may need to be changed to work properly.

(*) Note : **DO NOT CONNECT** to the male JST connector present on the board anything else than a Li-Po battery whose characteristics are compliant with those indicated above. Please **DO NOT POWER VIN** with more than 5V.

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