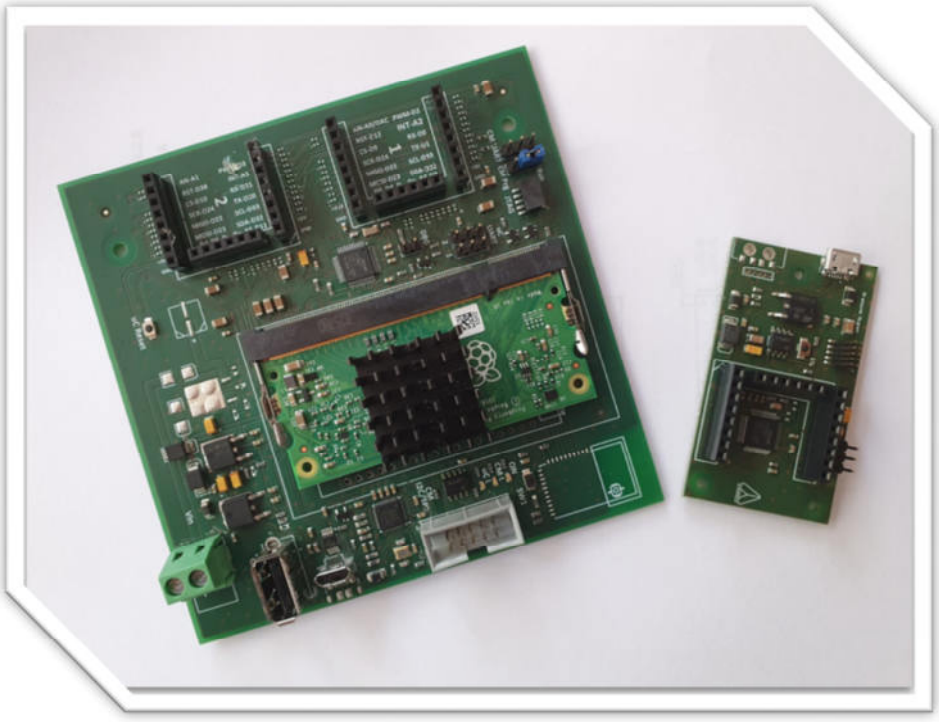
Getting Started

Arancino.cc™ and Arancino.cc™ Mignon boards

January 2020 – Version 1.0



Summary

READY TO GET STARTED?

Dear Customer,
We thank you for choosing one of our products whose correct use guarantees solutions of the highest quality and reliability over time.

In many applications it is useful to have a continuous monitoring of indoor and / or outdoor environments for statistical purposes, security, evaluation of effectiveness and optimization.
Arancino.cc ™ is an innovative embedded system developed by SmartMe.IO® that can be used in applications ranging from simple temperature detection to automotive applications, artificial intelligence, machine learning, neural networks, Cloud, big data analysis, predictive maintenance, etc. The operating system used is a Linux distribution designed to be used on embedded systems, effectively making the product a real Single Board Computer, to which is added the microcontroller for the execution of real-time code.

PRODUCTS

- Arancino.cc™ Board (1.0.2)
- Arancino.cc™ Mignon Board (1.2)

EU DECLARATION OF CONFORMITY

The above-mentioned products, placed on the European Community market by the Company, are in conformity with:

- the Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast).
- the Directive 2011/65/EU on the Restriction of Certain Hazardous Substances in Electrical and Electronic Equipment.

APPLICATIONS

- Internet of Things
- Cyber Physical Systems
- Smart Environments
- Industrial
- Automotive
- Utilities

DOCUMENT EDITION

First edition (version 1.0 – January 2020).

WARNINGS AND GENERAL PRECAUTIONS

Please carefully read this document before proceeding to the installation of the device and keep it in a safe place and in good condition for future use and maintenance of the device.

- Make sure that the device has not been damaged during transport, the storage phase or the installation.
- The installation must be carried out in an appropriate way and place, in order to guarantee the correct functioning of the device.
- The installation and maintenance of the device must be carried out in full compliance with current safety regulations.

WARRANTY

12 months. Any changes or alterations made to the equipment, if they have not been expressly approved **in writing** by the manufacturer, void the warranty and authorization for use by the user.

LIMITATIONS AND DISCLAIMER OF THE WARRANTY

In no event will the seller be liable to any other party or person for the following:

- Damage by negligence in compliance with the general precautions.
- Personal damage or any damage caused by inappropriate use or negligence by the User.
- Unauthorized dismantling, repair or modification of the product by the User.
- Any problem, resulting in inconvenience, loss or damage, resulting from the system in combination with nearby devices.

TECHNICAL DESCRIPTION OF COMPONENTS

Arancino.cc™ Board (1.0.2)

- Microcontroller
  - ARM Cortex M0+ running at 48MHz
  - 256kB Flash
  - 32kB SRAM
- Microprocessor
  - CPU: Broadcom BCM2837 @ 1.2GHz *
  - RAM: 1 GB di RAM LPDDR2 *
  - STORAGE: 4 GB eMMC. *
- I/O and Devices
  - Up to 32 GPIO

  - Up to 6x 350ksps 12-bit ADC with programmable gain
  - 1x 10-bit 350ksps DAC
  - 12 Channels DMA Controller
  - 12 Channels Event System
  - Programmable interrupt Controller
  - 32-bit Real Time Clock and calendar
  - 3x 24-bit Timer/Counter
  - Watchdog Timer (WDT)
  - 3x USB Full-Speed 2.0 port
  - 2x I2C Interface
  - 2x SPI Interface
  - 1x I2S Interface
  - 2x UART
- Expansions
  - 2x Arancino.cc™ Connector**

Arancino.cc™ Mignon Board (1.2)

- Microcontroller
  - ARM Cortex M0+ running at 48MHz
  - 256kB Flash
  - 32kB SRAM
- I/O and Devices
  - Up to 18 GPIO
  - Up to 3x 350ksps 12-bit ADC with programmable gain
  - 1x 10-bit 350ksps DAC
  - 12 Channels DMA Controller
  - 12 Channels Event System
  - Programmable interrupt Controller
  - 32-bit Real Time Clock and calendar
  - 3x 24-bit Timer/Counter
  - Watchdog Timer (WDT)
  - 1x USB Full-Speed 2.0 port
  - 1x I2C Interface
  - 1x SPI Interface
  - 1x I2S Interface
  - 2x UART
- Expansions
  - 1x Arancino.cc™ Connector**

** The MPU connector is compatible with Raspberry PI Compute Modules.*
*** The Arancino.cc™ Connector is an extension of MikroBus connector. It is fully Hardware compatible with Mikroelektronica Click Boards.*

Arancino.cc™ Connectors

The Arancino.cc™ Connector is an expansion which is present on the Arancino.cc™ boards. The purpose is to enable easy hardware expandability with a large number of standardized compact add-on boards, each one carrying a single sensor or compliant hardware module.

PINOUT SPECIFICATION

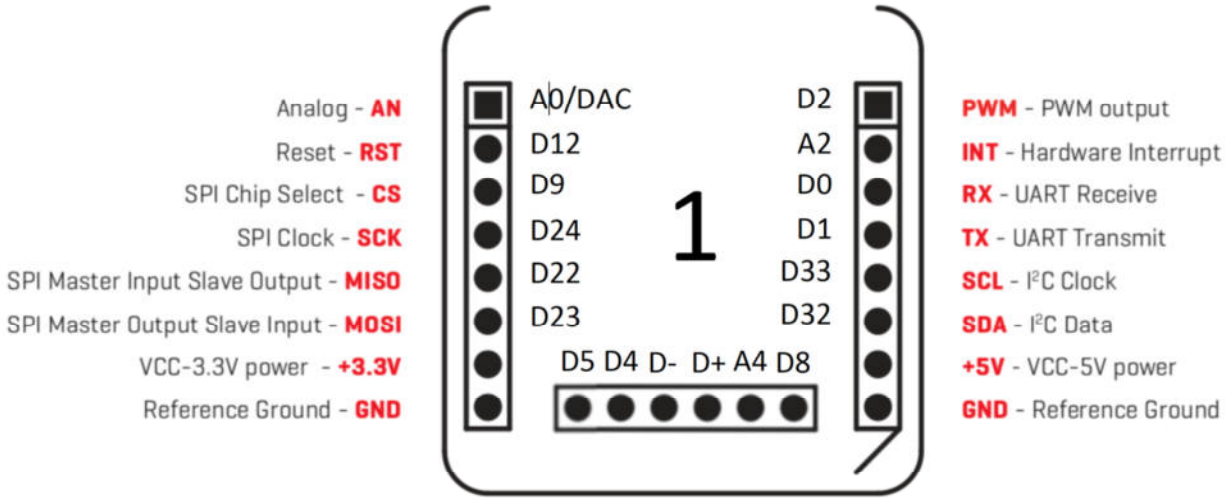


Fig.1 SmartMe.IO® Arancino.cc™ Connector 1

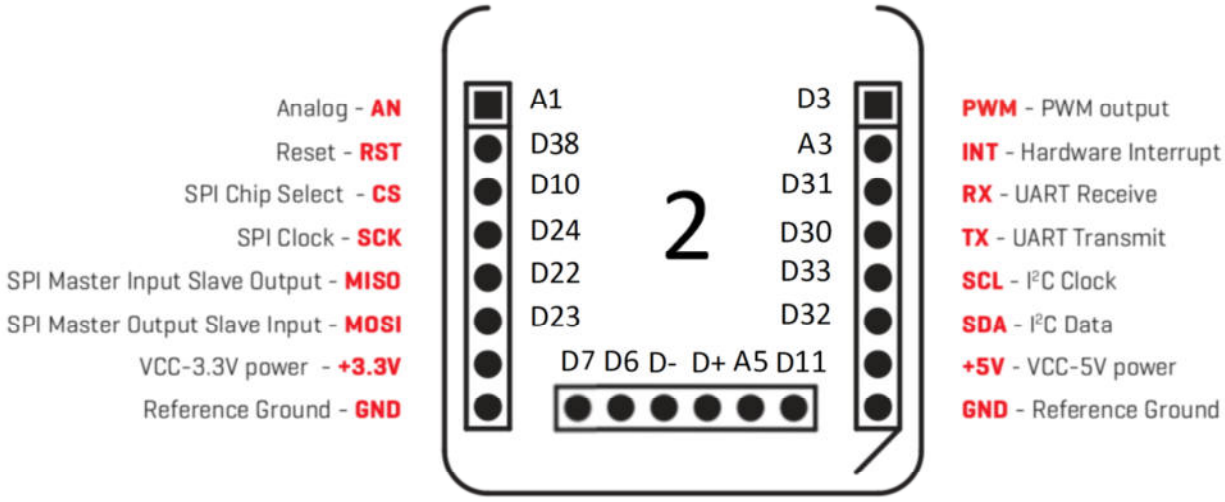


Fig.2 SmartMe.IO® Arancino.cc™ Connector 2

The Arancino.cc™ Board is equipped with both the Connectors 1 and 2.
The Arancino.cc™ Mignon Board is equipped with the Connector 1, but D- and D+ are not used.

HOW TO CONFIGURE THE ARANCINO.CC™ BOARDS

HOW TO IMPORT ARANCINO LIBRARY INTO THE ARDUINO IDE

The Arancino Library works on Arancino.cc™ boards. It is written in Arduino language and it can be imported into the Arduino IDE. Arancino Library is written to run on SAMD21 Microcontroller over SAMD Arduino platform. It uses the serial connection to communicate with the Arancino Module which runs on the linux side of the Arancino.cc™ board. It uses the `SerialUSB` library to communicate with the Arancino Module and the `Serial` library for debug. Arancino Library allows to export/import data to/from the Linux environment using Redis as database cache. The API are modelled on Redis standard Commands.
To get started with Arancino Library you can download the latest version from the repository `arancino-library` within the smartme.IO Repository Management Site[1] or directly from Arduino Library Manager.

From a .zip file

1. Download the latest version from the above-mentioned repository. Is is a .zip file.
2. Open the Arduino IDE and import the unzipped folder (*Sketch → Include Library → Add .zip Library...*). The library will appear under *Sketch → Include Library* menu at the end, under the *Contributed* section. Examples will be under *File → Examples → Examples* of *Custom Libraries*.

From Arduino Library Manager

1. Open the Arduino IDE and go to *Sketch → Include Library → Manage Libraries*, the Arduino Library Manager window will be shown. Using the text box, type *Arancino*; finally select the Arancino Library item within the result list and click install. Be sure to select the latest version available.

Important Note:

Arancino Library uses FreeRTOS_SAMD21 Arduino library[2] for samd21 when runs on Atmel samd21 uC (all Arancino Boards have Atmel samd21, please download Arduino platform package index for Arancino.cc™ Boards here). FreeRTOS Library needs some extra flags when compile sketches, so for Arancino.cc™ boards whithin Arancino Library please pay attention and select Yes from *Menu -> Tools -> Using Arancino Library?:* in Arduino IDE. Consequently select No when you are not using Arancino Library.

Note:

Arancino Library has one dependency: FreeRTOS_SAMD21 Arduino library by BriscoeTech. Please download it from *Arduino Library Manager*.

[1] https://download.smartme.io/artifactory/list/arancino-library/
[2] https://github.com/BriscoeTech/Arduino-FreeRTOS-SAMD21

HOW TO INSTALL THE ARANCINO.CC™ PLATFORM

For Atmel's SAMD21 processor (used on the Arancino.cc™ and Arancino.cc™ Mignon boards).

Installation on Arduino IDE

1. Open the *Preferences* of the Arduino IDE.
2. Add this URL: https://git.smartme.io/smartme.io/arancino/arduino/smartmeio-package-index/raw/master/package_smartmeio_index.json in the **Additional Boards Manager URLs** field, and click OK.
3. Open the **Boards Manager** (menu *Tools->Board->Board Manager...*)
4. Install **Arancino Boards**
5. Restart the Arduino IDE
6. Select one of the boards under **Arancino Boards** in *Tools->Board* menu
7. Compile/Upload as usual

HOW TO FLASH ARANCINO.CC™ OS ON COMPUTE MODULE

Preliminary operation: move the highlighted jumper (red arrow) in **Fig.3** to **Prg**.
Required software: **git** and **libusb**

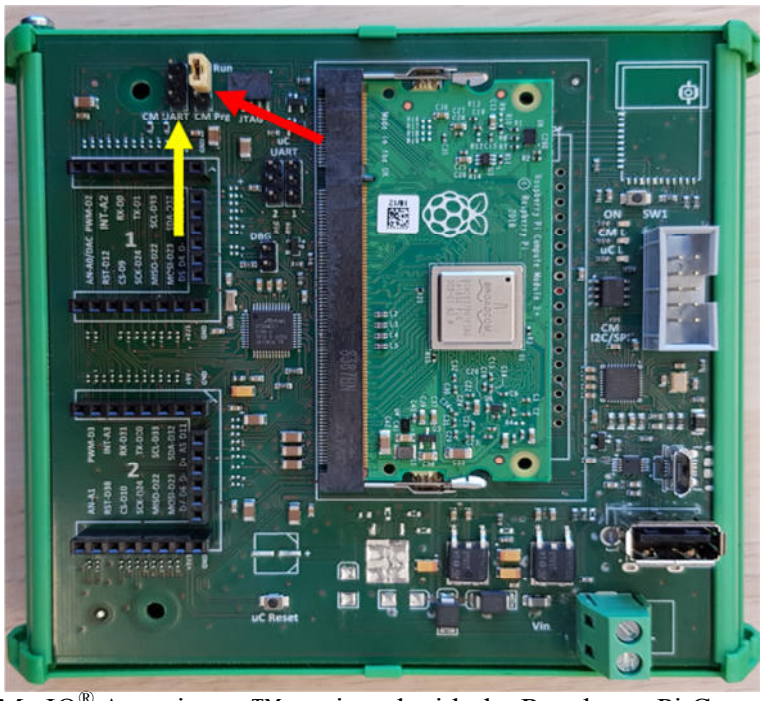


Fig.3 SmartMe.IO® Arancino.cc™ equipped with the Raspberry Pi Compute Module.

Windows / Linux: follow the official guide
https://www.raspberrypi.org/documentation/hardware/computemodule/cm-emmc-flashing.md

MacOS:

1. Install libusb by using **brew:**

   ```
   brew install libusb
   ```

2. Install **rpiboot:**

   ```
   git clone --depth=1 https://github.com/raspberrypi/usbboot
   cd usbboot
   make
   sudo ./rpiboot
   ```

   If the error "Failed to claim interface" is returned, first connect the Arancino.cc™ board and then:

   ```
   sudo ./rpiboot
   ```

Image writing

- connect the Arancino.cc™ board
- open **Balena Etcher**[3]
- select the ArancinoOS image
- select the drive for the compute module
- start writing

At the end of the writing process turn off the board and move the jumper from Prg to **Run** (**Fig. 3**).

SERIAL CONNECTION

Both the Arancino.cc™ Board (1.0.2) and the Arancino.cc™ Mignon Board (1.2) have a serial port (highlighted by the yellow arrow in **Fig.3** for the Arancino.cc™ Board). The pins from top to bottom in the figure are: *GND*, *RX*, *TX*. The logic voltage level high threshold is + **3.3V**.

[3] https://www.balena.io/etcher/

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