

BITalino Mini Solo

Datasheet

BMS20201124

SPECIFICATIONS

- > **Sampling Rate:** 1, 10, 100 or 1000Hz
- > **Analog Ports:** 4 in (10-bit) + 2 in (6-bit) + 1 auxiliary in (battery) + 1 out (8-bit)
- > **Digital Ports:** 2 in (1-bit) + 2 out (1-bit)
- > **UC-E6 Ports:** A1/I1O1
- > **Communication:** BLE, SPI, UART
- > **Microcontroller:** ATmega328PB (QFN)
- > **Range:** up to ~300m (in line of sight)
- > **Size:** 56x21x6mm
- > **Consumption:** ~34 mA

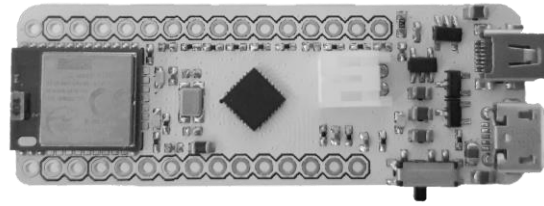


Fig. 1. BITalino Mini Solo

FEATURES

- > All-in-one ready-to-use design
- > Small form-factor
- > Raw data acquisition
- > On-board battery charger
- > Easy-to-use
- > Affordable

APPLICATIONS

- > Biomedical projects
- > Electrical engineering
- > Human-Computer Interaction
- > Robotics & Cybernetics
- > Physiology studies
- > Biofeedback

GENERAL DESCRIPTION

The BITalino Mini Solo represents the BITalino range of products in its smallest and simplest form. Its integrated UC-E6 port can be used as analog input or a digital input/output by selecting the desired feature with a jumper which allows the use of all already existent sensors for a fast and simple prototyping experience.



PLUX – Wireless Biosignals, S.A.
Av. 5 de Outubro, n. 70 – 2.
1050-059 Lisbon, Portugal
bitalino@plux.info
<http://bitalino.com/>

REV A

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BEWARE: DIRECT OR INDIRECT COUPLING TO THE MAINS MAY RESULT IN SHOCKING HAZARD



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DIMMENSIONS

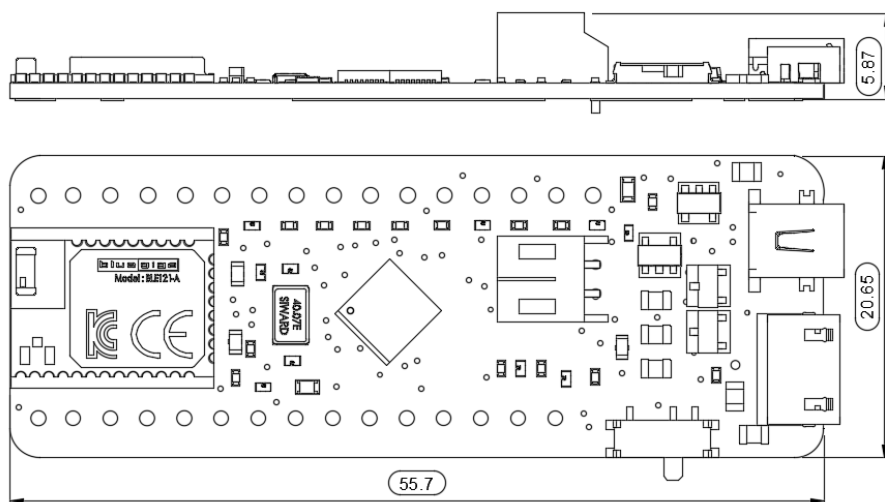
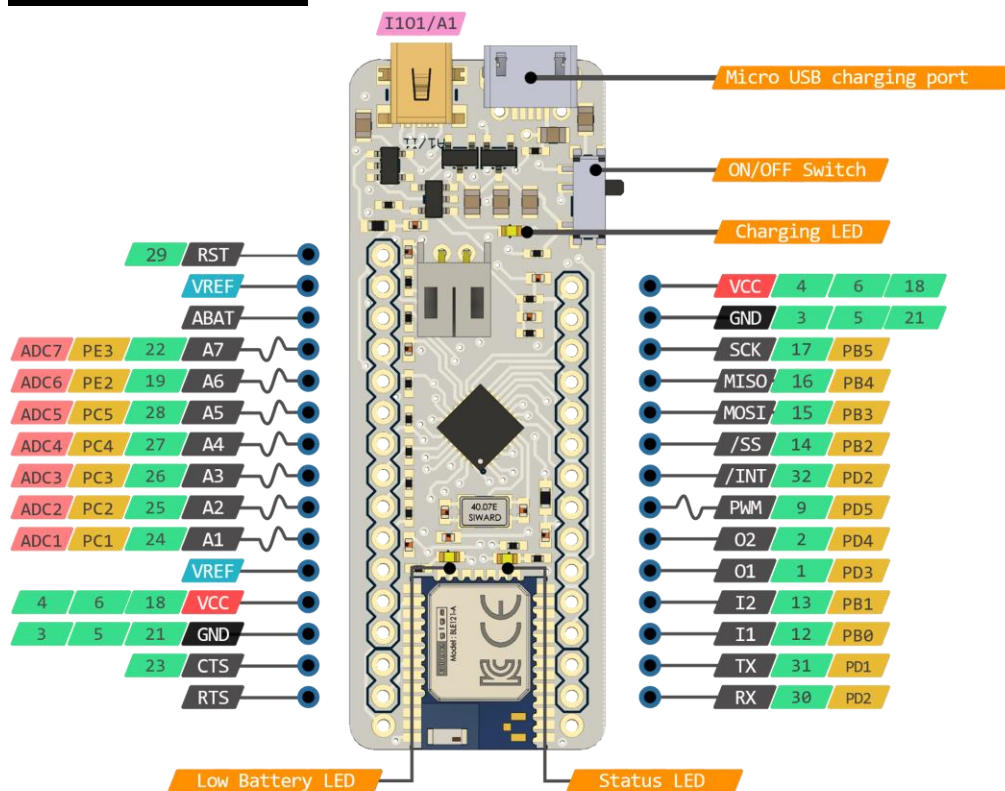


Fig. 2. BITalino Mini Solo Dimensions (mm)

PINOUT DIAGRAM TOP



- VCC** 3,3V Power source
- VREF** 1,65V Reference point
- GND** Ground
- PCB label**
- Physical Pin**
- Selected function**
- Microcontroller's Port Pin**
- UC-E6 Port**
- Analog port**

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Fig. 3. BITalino Mini Solo PINOUT Top

PINOUT DIAGRAM BACK

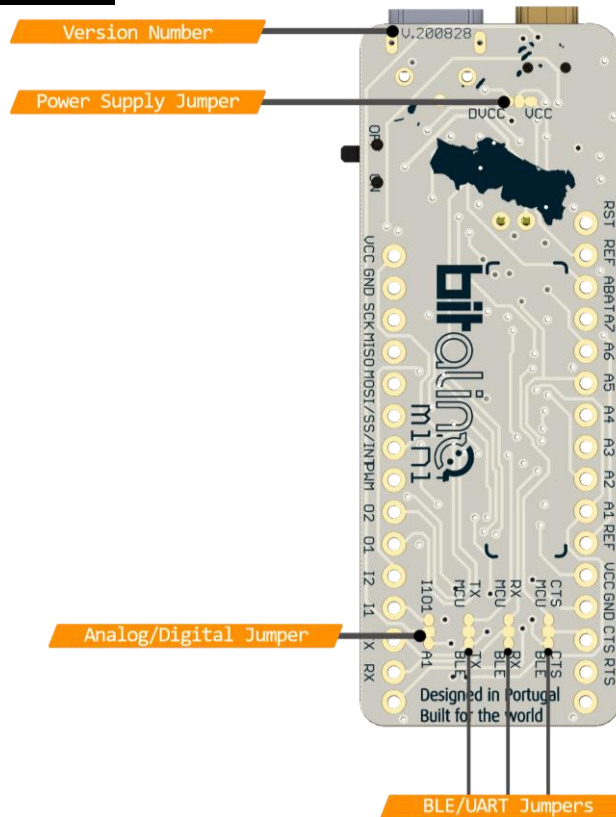


Fig. 4 - BITalino Mini Solo PINOUT Bot

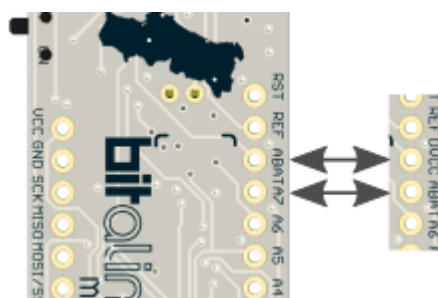
> **Power Supply Jumper:** Allows you to choose between the power supply dedicated to the analog or digital circuits depending on the sensor you want to connect to the UC-E6 port.

> **Analog/Digital Jumper:** By default, the embedded UC-E6 port is connected to the analog A1 channel. In order to plug a digital sensor into the UC-E6 port, cut* the jumper pad connecting the A1 channel to it and solder* the jumper to the I101 pad to enable digital communication with the device via the UC-E6 port.

* Always verify the cuts and solders are properly done using a multimeter.

> **BLE/UART Jumpers:** Cut these jumpers to virtually detach the BLE module from the Microcontroller and enable communication with the MCU through UART communication.

NOTE: For devices with version number **V.200828** the header hole with the label 'ABAT' is connected to 'DVCC' and the header hole with the label 'A7' is connected to 'ABAT'.



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ELECTRICAL CHARACTERISTICS

	Minimum	Typical	Maximum
Power Supply			
- VCC	1.8V	3.3V	5.5V
- DVCC	2.4V	3.3V	3.6V
Output Current			
- VCC			200mA
- DVCC			100mA
- Analog Output (PWM)			40mA
Analog/Digital Converter			
- Reference Voltage	1.0V		V _{CC}
- Input Voltage	GND		V _{REF}
- Internal Reference Voltage	1.0V	1.1V	1.2V
- Analog Input Impedance		100MΩ	

NOTE: The BITalino Mini uses the integrated ADC in the ATmega328PB. It was designed to be optimal reading signals from circuits with an output impedance not superior to **10kΩ**. For this reason, it is recommended that low output impedance circuits are used or that a buffer is fitted to the circuit's output.

COMMUNICATION

> **BLE/UART:** By default, the BITalino Mini uses the UART protocol to send information to the onboard Bluetooth Low Energy module to communicate wirelessly with other devices, such as a computer where live data acquisition can be done with its dedicated software Opensignals¹. However, as mentioned above, the BLE Module can be virtually detached from the board to enable direct communication between the MCU and an external device using the Tx and Rx pins of the board. Either way, the information outputted by the MCU is set by default to the following parameters:

- 1 Start bit
- 8 Data bits
- No parity bit
- 1 Stop bit
- 115200 Baud rate (0.2% error due to Baud Rate approximation)
- Double Speed Mode

By programming the firmware of the BITalino it is still possible to set the UART communication to any format resulting from a combination of the following characteristics:

- 1 start bit
- 5 to 9 data bits
- 1 optional parity bit (none, odd or even)
- 1 or 2 stop bits
- Single or Double speed mode
- Baud Rate up to 1.5Mbps

> **SPI:** The BITalino Mini presents header holes connected to MISO, MOSI, SCK and SS to enable the SPI communication protocol present on the ATmega328PB. However, the firmware loaded by default does not implement this functionality. This functionality can be enabled by

¹ <https://bitalino.com/downloads/software>

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the user by modifying the firmware made available on Github². For more information on enabling the SPI peripheral, please refer to the ATmega328PB datasheet³.

PACKAGING



Fig. 5. BITalino mini Solo is shipped in a convenient eco-friendly packaging

ORDERING GUIDE

Part #	Description
COMP-PCB-MINI-BLE-BT	BITalino mini Solo with Dual mode Bluetooth connectivity and one analog channel available with UC-E6 socket
KIT-MINI-SOLO-DUAL-UCE6	BITalino mini Solo Kit includes a mini Solo PCB, a 240 mAh battery, Micro USB charging cable and female & male pinout headers to allow the PCB connection to a breadboard, for example.

² <https://github.com/BITalinoWorld/firmware-bitalino-revolution>

³ <https://ww1.microchip.com/downloads/en/DeviceDoc/40001906C.pdf>