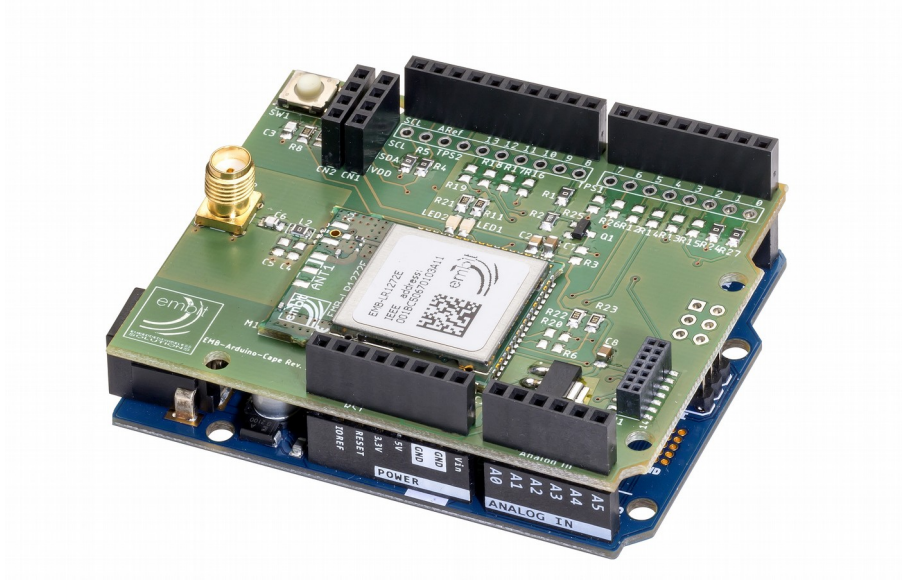


EMB-Arduino-Cape-1272

Datasheet

Revision 1.0



embit s.r.l.

Document information

Versions & Revisions

Revision	Date	Author	Comments
0.1	2018-10-01	Embit-MDD	Initial release
1.0	2019-02-28	Embit-MDD	Revision 1.0

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1 Introduction

The **EMB-Arduino-Cape-1272** is an Arduino compatible shield with the **EMB-LR1272 / EMB-LR1272E** [1], a powerful OEM sub-1GHz wireless module that provides ultra-long range spread spectrum communication and high interference immunity on the 868/915 MHz radio band.

It is based on Semtech SX1272 transceiver coupled with Atmel® ATSAM20/L21 MCU, equipped with up to 256 KBytes of FLASH memory and up to 32 KBytes of SRAM memory.

The module, that combines high performance to small dimensions and low cost, provides to the system integrator and the maker a simple and easy way to add LoRa / LoRaWAN™ long range connectivity into their Arduino projects.

The **EMB-Arduino-Cape-1272** is provided with an embedded LoRa/LoRaWAN™ stack specifically developed by Embit that allows to be compliant with the latest LoRaWAN™ specifications, allowing customer to develop firmware application and manage a compatible LoRa eco-system.

It is programmed with **EBI-LoRa** which allows the customer to use the modules as a simple, ready-to-use modem (using AT-like commands over UART). The module can be also configured as an embedded micro system capable to communicate with other devices through a wide range of serial interfaces such as UART, I2C and SPI and several digital and analog I/O ports.

The **EMB-Arduino-Cape-1272** is compatible with: Arduino / Genuino Zero board, Arduino Due board [2].

1.1 Specifications

- Operating Voltage: +3.3V
- Current Consumption: 34mA @+14dBm (TX)
125mA @+19dBm (TX)
12mA (RX)
- Output Power: up to +14dBm; up to +19dBm (opt.)
- RX Sensitivity: up to -137dBm at 300 bps
- Antenna: SMA connector
- Operating Temperature: -40°C to +85°C
- Interfaces: SPI / I2C / UART / GPIOs / ADC / SWD
- Dimensions: 68 x 53 x 1.6 mm
- Weight:

- Features: Easy integration with Arduino / Genuino Zero board, Arduino Due board
Embedded IEEE EUI-64 address
- Part Number: EMB-Arduino-Cape-1272

1.2 Applications

The device can be used in several application where LoRa nodes are needed, such as:

- Internet Of Things (IOT)
- Automated Meter Reading
- Smart Cities
- Home and Building Automation
- Wireless Alarm and Security System
- Machine to Machine (M2M)
- Industrial Monitoring and Control
- Long Range Irrigation System.

2 Description

2.1 Block Diagram

The **EMB-Arduino-Cape-1272** block diagram:

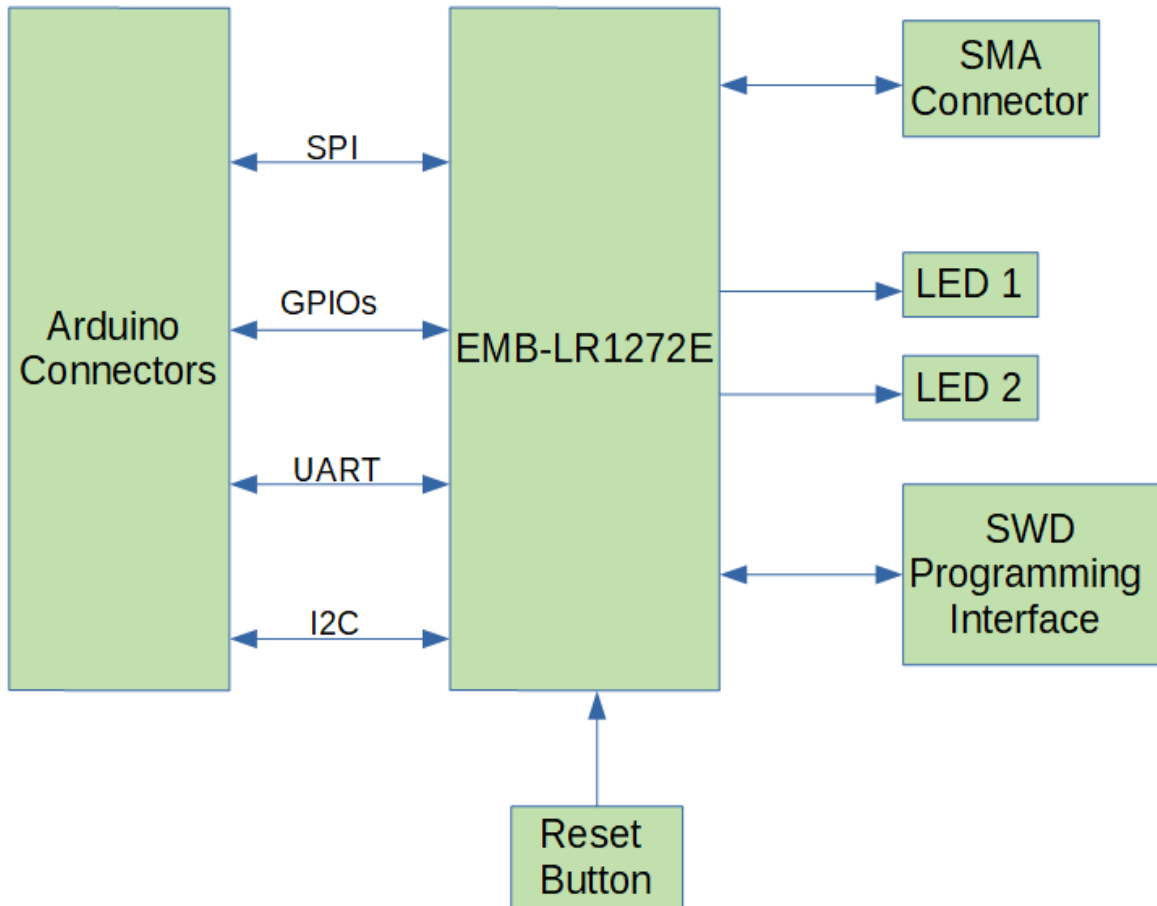


Figure 1.EMB-Arduino-Cape-1272 Block Diagram.

2.2 Hardware description

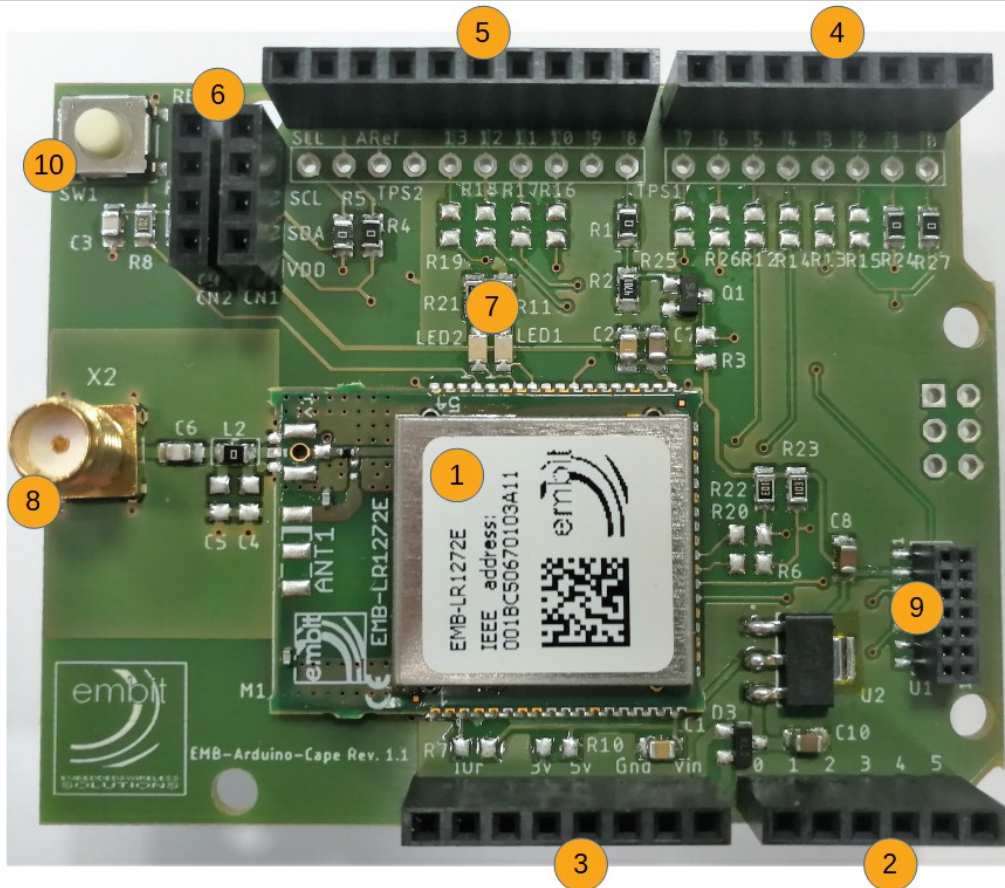


Figure 2. EMB-Arduino-Cape-1272 rev. 1.1 board.

1. EMB-LR1272E.

It is the Embit LoRa / LoRaWAN™ wireless module used to send data.

2-3-4-5. Arduino Connectors.

2:

A0	A1	A2	A3	A4	A5
----	----	----	----	----	----

3:

x	IOREF	RST	3.3V	5V	GND	GND	Vin
---	-------	-----	------	----	-----	-----	-----

4:

7	6	5	4	3	2	1	0
---	---	---	---	---	---	---	---

5:

SCL	SDA	AREF	GND	13	12	11	10	9	8
-----	-----	------	-----	----	----	----	----	---	---

6. I2C Connectors (x2).

Two connectors with I2C bus and power.

1 (Vcc)	2 (SDA)	3 (SCL)	4 (GND)
---------	---------	---------	---------

Legend:

Reserved (can not be used for other purposes)
GPIO/Analog
I2C
Power

7. LEDs (x2).

Two green LEDs controllable by EMB-LR1272E GPIOs.

8. SMA Antenna Connector.

Connector for mounting 868 / 915 MHz antenna.

9. SWD Programming Interface Connector.

Connector for programming / debugging the EMB-LR1272E.

10. Reset Button.

Button to reset the EMB-LR1272E module.

2.3 Hardware Setup

The hardware setup is extremely simple. Just connect the antenna into the SMA connector and mount the **EMB-Arduino-Cape-1272** onto the Arduino board. See picture below.



Figure 3. EMB-Arduino-Cape-1272 installation onto the Arduino Zero board.

3 Electrical Characteristics

3.1 Absolute Maximum Ratings

Parameter	Value	Unit
Power Supply Voltage	03.06.00	Vdc
Storage Temp. Range	-50 to +125	°C

Table 1: Absolute maximum ratings.

3.2 Operating Conditions

Parameter	Min	Max	Unit
Power Supply Voltage (Vcc)	+1.8	+3.6	V
Operating Temperature range	-40	+85	°C

Table 2: Operating Conditions.

3.3 Power Consumption

Mode	Typ. value	Unit
TX @+14dBm	34	mA
TX @+19dBm	125	mA
RX	12	mA

Table 3: Power Consumption.

3.4 RF Characteristics

	Min.	Typ.	Max.	Unit	Note
RF Frequency Range	863		870	MHz	
RF Data Rate LoRa	0.3		37.5	kbps	
Programmable Output Power Range			+19 +14	dBm dBm	EMB-LR1272 EMB-LR1272E
Receiver Sensitivity RB=300 bps BW=125 kHz		-137		dBm	LoRa modulation
Receiver Sensitivity RB=3.1 kbps BW=125kHz		-126		dBm	LoRa modulation
Receiver Sensitivity RB=9 kbps BW=125 kHz		-121		dBm	LoRa modulation
Receiver Sensitivity RB=1.2 kbps BW=500 kHz		-129		dBm	LoRa modulation
Receiver Sensitivity RB=3.9 kbps BW=500 kHz		-126		dBm	LoRa modulation
Receiver Sensitivity RB=37 kbps BW=500 kHz		-111		dBm	LoRa modulation
RF Input Saturation		+10		dBm	

Table 4: RF Characteristics.

4 References

- [1] Emfit, EMB-LR1272E Datasheet
- [2] Arduino, Arduino Zero Datasheet

5 Disclaimer of liability

The user must read carefully all the documentation available before using the product. In particular, care must be taken in order to comply with the regulations (e.g., power limits, duty cycle limits, etc.).

5.1 Handling Precautions



This product is an ESD sensitive device. Handling precautions should be carefully observed.

5.2 Limitations

Every operations involving a modification on the internal components of the module will void the warranty.

5.3 Disclaimer of Liability

The information provided in this and other document associated to the product might contain technical inaccuracies as well as typing errors. Regulations might also vary in time. Updates to these documents are performed periodically and the information provided in these manuals might change without notice. The user is required to ensure that the documentation is updated and the information contained is valid. Embit reserves the right to change any of the technical/functional specifications as well as to discontinue manufacture or support of any of its products without any written announcement.

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