

Low Power Solutions - LoRaWAN-megaBrick Documentation

Version - v00, 14 Nov 2020

Description

- Arduino compatible LoRaWAN development board using **Atmega1284p** MCU (3.3v @ **16MHz**) and **RFM95** (868/915 MHz) module.
- Atmega1284p has **128KB of Flash** and **16KB of SRAM** in comparison to Atmega328p (UNO, Pro Mini, etc) which has 32KB of Flash and 2KB of SRAM. For more details please see [datasheet](#).
- Bootloader is same as - [MightCore](#) from [MCUDude](#).
- Low power board without redundant components.
- SMA and U.FL compatible antenna connector.
- On board reset button and an LED.
- Breadboard compatible.
- The detailed dimension of the board is shown in one of the image. For quick reference : 64.01 x 25.91 mm

How to program?

First you need to add *board support* in Arduino IDE, please follow the below steps of *Board Manager Installation* (copied from [MightCore](#) for the sake of continuity).

Boards Manager Installation

This installation method requires Arduino IDE version 1.6.4 or greater.

- Open the Arduino IDE.
- Open the **File > Preferences** menu item.
- Enter the following URL in **Additional Boards Manager URLs**: https://mcutude.github.io/MightyCore/package_MCUdude_MightyCore_index.json
- Separate the URLs using a comma (,) if you have more than one URL
- Open the **Tools > Board > Boards Manager...** menu item.
- Wait for the platform indexes to finish downloading.
- Scroll down until you see the **MightyCore** entry and click on it.
- Click **Install**.
- After installation is complete close the **Boards Manager** window.

Select MCU

- In Arduino IDE, open **Tools > Board:** and select **ATmega1284** under MightCore.
- Open **Tools > Bootloader:** and select **Yes (UART0)**
- Open **Tools > Pinout:** and select **Standard pinout**
- Open **Tools > Clock:** and select **External 16 MHz**
- Open **Tools > BOD:** and select **BOD 2.7V**
- Open **Tools > Compiler LTO:** and select **LTO disabled**
- Open **Tools > Variant:** and select **1284P**

How to enable LoRaWAN in Arduino code?

- To enable LoRaWAN close three jumpers marked as D1, D2 and RST on the board.
- A very famous LoRaWAN Arduino library is available to use : [arduino-lmic](#)
- In the example codes of the library, change the pin mapping as shown below : `const lmic_pinmap lmic_pins = { .nss = 4, .rxtx = LMIC_UNUSED_PIN, .rst = 3, .dio = {2, 22, 23},};`

Arduino Pin Mapping

MCU and RFM95 pin mapping

Arduino Pin No.	RFM95	Comments
6	MISO	
5	MOSI	
7	SCK	
4	NSS	
3	RESET	via jumper RST
2	DIO0	

Arduino Pin No.	RFM95	Comments
22	DIO1	via jumper D1
23	DIO2	via jumper D2

MCU and LED Pin Mapping

- An on board LED is available via jumper (JL) for testing purpose.
- The LED is connected to Arduino pin number 27

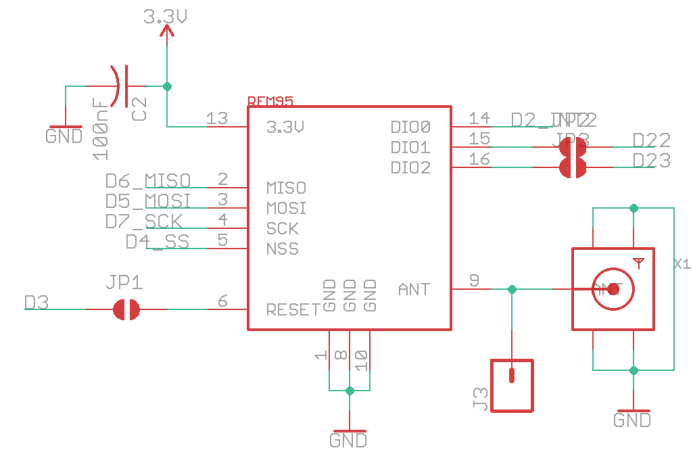
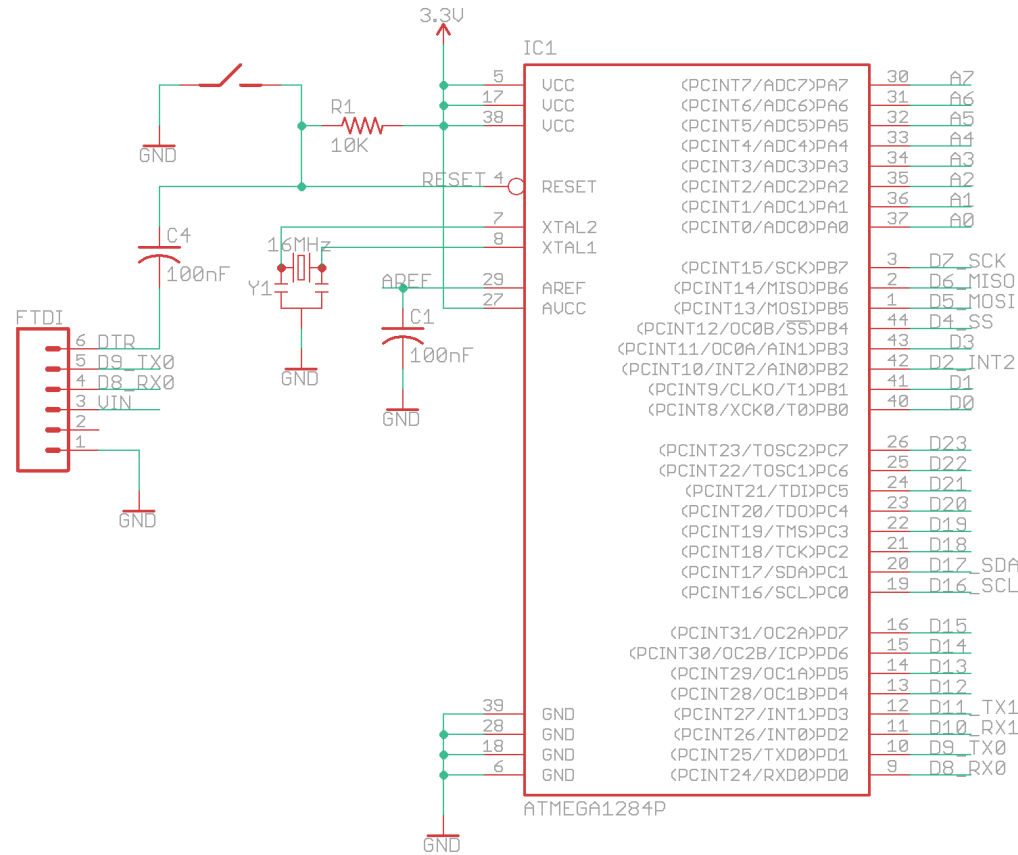
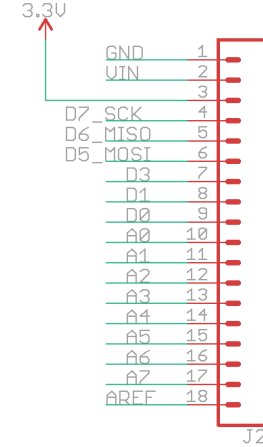
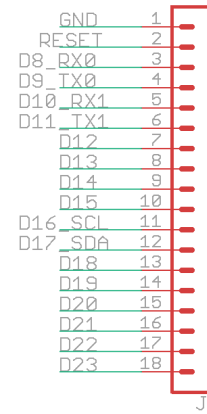
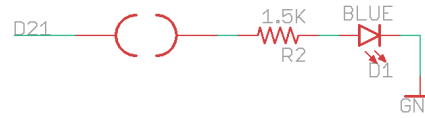
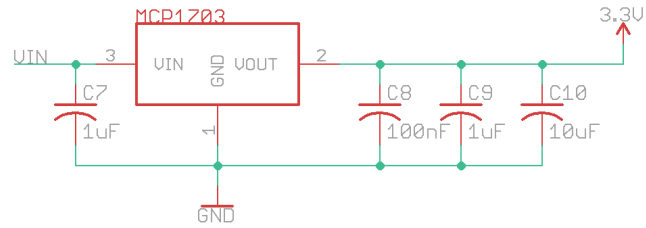
Other important functionalities (for more details see [image](#))

Arduino Pin No.	Function	Connected to	Comments
1	-	-	-
2	INT2	RFM95 DIO0	-
3	-	RFM95 RESET	via jumper RST
4	SS	RFM95 NSS	-
5	MOSI	RFM95 MOSI	-
6	MISO	RFM95 MISO	-
7	SCK	RFM95 SCK	-
8	RXD0	-	used by USB-to-Serial adapter to upload code
9	TXD0	-	used by USB-to-Serial adapter to upload code
10	RXD1/INT0	-	UART1 RX and interrupt-0
11	TXD1/INT1	-	UART1 TX and interrupt-1
12	OC1B	-	PWM
13	OC1A	-	PWM
14	OC2B	-	PWM
15	OC2A	-	PWM
16	I2C-SCL	-	
17	I2C-SDA	-	
18	-	-	-
19	-	-	-
20	-	-	-
21	-	LED	via jumper JL
22	-	RFM95 DIO1	via jumper D1
23	-	RFM95 DIO2	via jumper D2
A0/24	ADC0	-	-
A1/25	ADC1	-	-

Arduino Pin No.	Function	Connected to	Comments
A2/26	ADC2	-	-
A3/27	ADC3	-	-
A4/28	ADC4	-	-
A5/29	ADC5	-	-
A6/30	ADC6	-	-
A7/30	ADC7	-	-
AR	AREF	-	Analog Reference

Input Voltage Requirements

- Input voltage **VIN** range 3.3v to 12v, but because of high dropout voltage at higher output current I would advise to use **VIN** range 4v to 12v
- VIN is converted to 3.3v using an on board regulator (MCP1703A) with maximum output current of 250 mA.
- Both MCU and RFM95 are powered from this regulated 3.3v
- The regulated 3.3V is available on one of the pins of the board and can be used to power external circuit.



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