Mighty Net

PRODUCT SPECIFICATION

MTDuino-SFM2CWW001

M0 and SigFox connectivity module

MTDuino-SFM2CWW001

1. General Description

The MTDuino-SigFox is powered by Atmel's SAMD21 MCU, featuring a 32-bit ARM Cortex® M0 core. With the addition of the M0 board, the Arduino family becomes larger with a new member providing increased performance.

It is based on the Microchip SAMD21 and a UPLYNX-M-RCZx SigFox module.

2.2 Technical Specifications

Microcontroller	ATSAMD21G18, ARM Cortex-M0+, 48pins LQFP
Board Power Supply (USB/VIN)	5V
Supported Batteries(*)	Li-polymer battery
Circuit Operating Voltage	3.3V
Digital I/O Pins	20
PWM Output	12
Analog Input Pins	6 (ADC 8/10/12 bit)
Analog Output Pins	1 (DAC 10 bit)
DC Current per I/O Pin	7 mA
Flash Memory	256 KB
SRAM	32 KB
Clock Speed	32.768 kHz (RTC), 48 MHz
Antenna power	0.3dB @ 868M, 1.3 dB @ 915M
Carrier frequency	868 MHz, 915MHz
Working region	World Wide(WW)
Lenght	67 mm
Width	25 mm

Power

The MTDuino-SigFox can be powered via the micro USB connection or with an external power supply. The power source is selected automatically. External (non-USB) power can come either from Lithium-battery. The MTDuino-SigFox will automatically detect which power sources are available and choose which one to use according to the following priority:

- External power: Li-polymer battery
- Target USB

The MTDuino-SigFox is a Constant-Voltage (CV) and Constant-Current (CC) type charging IC for linear charging of single-cell Li-ion batteries and Li-polymer batteries.

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Input and Output

Each of the 14 digital i/o pins on the MTDuino-SigFox can be used as an input or output, using pinMode(), digitalWrite(), and digitalRead() functions. They operate at 3.3 volts. 7mA as maximum DC current for I/O pins and an internal pull-up resistor (disconnected by default) of 20-60 kOhms. In addition, some pins have specialized functions:

- Serial: 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data using the ATSAMD21G18 hardware serial capability. Note that on the M0, the SerialUSB class refers to USB (CDC) communication; for serial on pins 0 and 1, use the Serial5 class.

- TWI: SDA and SCL. Support TWI communication using the Wire library.

- PWM: Pins 2 to 13 Provide 8-bit PWM output with the analogWrite() function. The resolution of the PWM can be changed with the analogWriteResolution() function. Note1 The pins 4 and 10 can not be used simultaneously as PWM. Note2 The pins 5 and 12 can not be used simultaneously as PWM.

- Analog Inputs: A0-A5. The M0 has 6 analog inputs, labeled A0 through A5. Pins A0-A5 appear in the same locations as on the Uno; Each analog input provides 12 bits of resolution (i.e. 4096 different values). By default the analog inputs measure from ground to 3.3 volts, though is it possible to change the upper end of their range using the AREF pin and the analogReference() function.

- DAC: pin A0 provides true analog outputs with 10-bits resolution (1023 levels) with the analogWrite() function. This pin can be used to create an audio output using the Audio library.

- Reset: Bring this line LOW to reset the microcontroller. This is typically used to add a reset button when shields are used that block the one already present on the board.

Communication

The MTDuino-SigFox has a number of facilities for communicating with a computer, with another Arduino or other microcontrollers, and with different devices like phones, tablets, cameras and so on. The SAMD21 provides one hardware UART and three hardware USARTs for 3.3V serial communication. The Arduino software includes a serial monitor allowing simple textual data to be sent to and from the board. The RX and TX LEDs on the board will flash when data is being transmitted via the ATSAMD21G18chip and USB connection to the computer (but not for serial communication on pins 0 and 1). The Native USB port is connected to the SAMD21. It allows for serial (CDC) communication over USB. This provides a serial connection to the Serial Monitor or other applications on your computer. The SAMD21 also supports TWI and SPI communication. The Arduino software includes a Wire library to simplify use of the TWI bus. For SPI communication, you can use the SPI library.on the board.

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Programming

The MTDuino-SigFox can be programmed with the Arduino software. Uploading sketches to the SAMD21 is different from how it works with the AVR microcontrollers found in other Arduino boards: the flash memory needs to be erased before being re-programmed. Upload operation is managed by a dedicated ROM area on the SAMD21. USB port: To use this port, select "Arduino M0 (Native USB Port)" as your board in the Arduino IDE. The Native USB port is connected directly to the SAMD21. Connect the M0 Native USB port (the one closest to the reset button) to your computer.

Antenna

Manufacturer: Molex

Part Number: 105262-0002

Description: Antennas ISM 868/915 MHz ANTENNA 150MM

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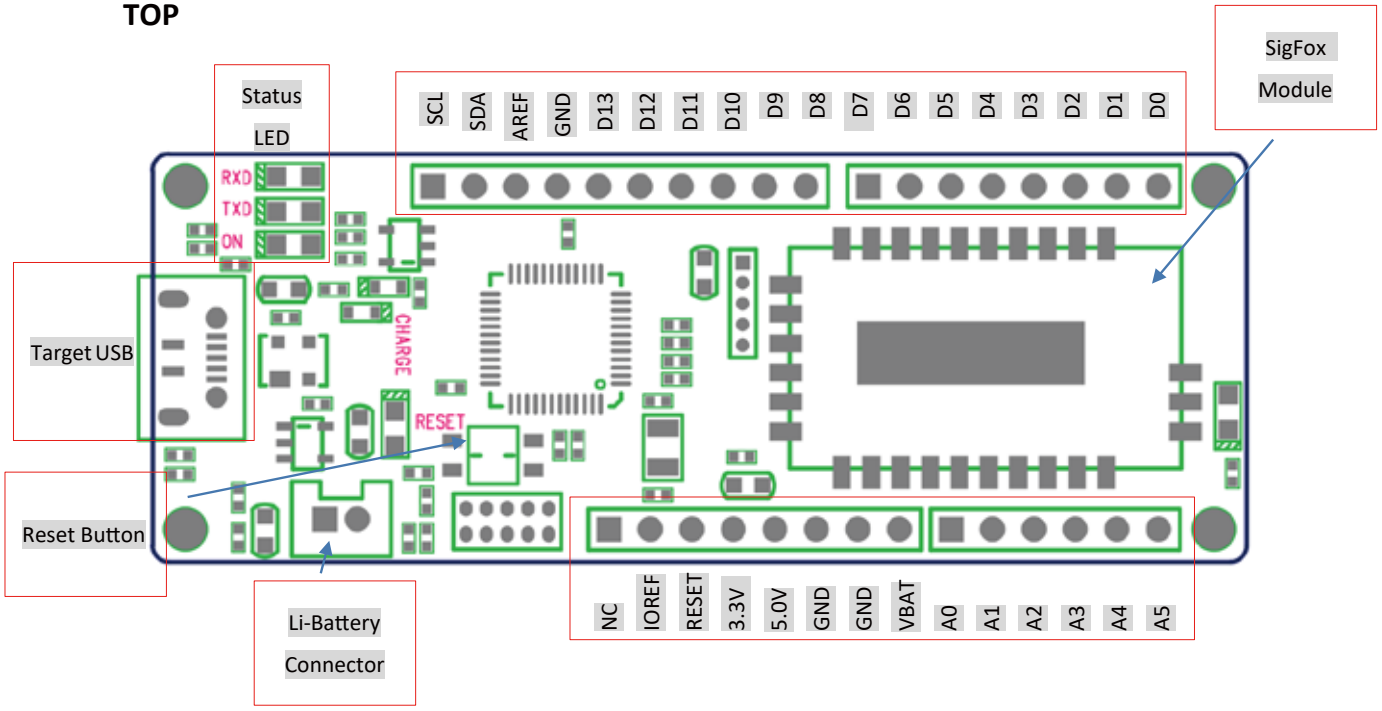
TOP



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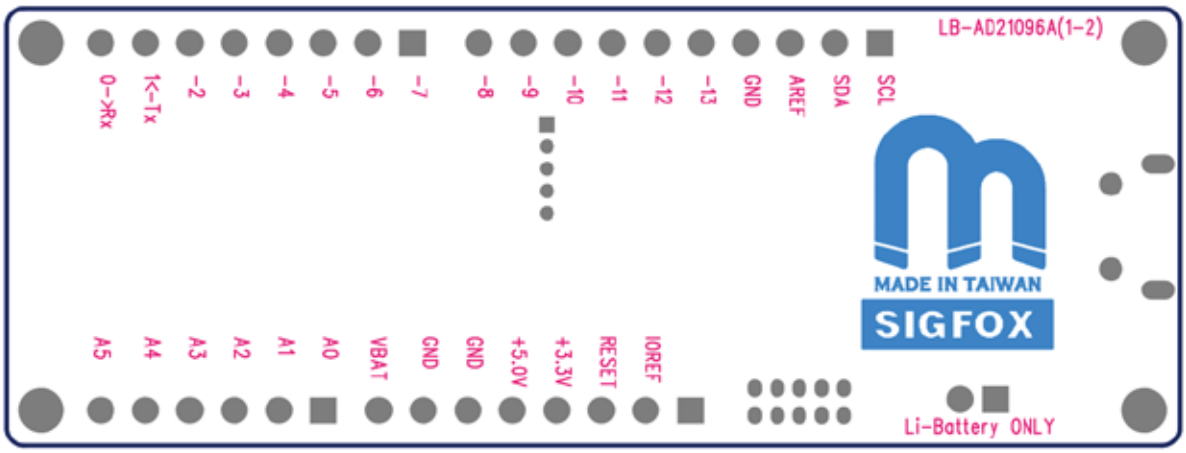

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Pin Assignment

Pin number	ZERO Board pin	PIN	Label/Name	Comments (* is for default peripheral in use)
	Digital Low			
0	0 -> RX	PA11		EIC/EXTINT[11] ADC/AIN[19] PTC/X[3] *SERCOM0/PAD[3] SERCOM2/PAD[3] TCC1/WO[1] TCC0/WO[3]
1	1 <- TX	PA10		EIC/EXTINT[10] ADC/AIN[18] PTC/X[2] *SERCOM0/PAD[2] TCC1/WO[0] TCC0/WO[2]
2	~2	PA08		EIC/NMI ADC/AIN[16] PTC/X[0] SERCOM0/PAD[0] SERCOM2/PAD[0] *TCC0/WO[0] TCC1/WO[2]
3	~3	PA09		EIC/EXTINT[9] ADC/AIN[17] PTC/X[1] SERCOM0/PAD[1] SERCOM2/PAD[1] *TCC0/WO[1] TCC1/WO[3]
4	~4	PA14		EIC/EXTINT[14] SERCOM2/PAD[2] SERCOM4/PAD[2] TC3/WO[0] *TCC0/WO[4]
5	~5	PA15		EIC/EXTINT[15] SERCOM2/PAD[3] SERCOM4/PAD[3] TC3/WO[1] *TCC0/WO[5]
6	~6	PA20		EIC/EXTINT[4] PTC/X[8] SERCOM5/PAD[2] SERCOM3/PAD[2] TC7/WO[0] *TCC0/WO[6]
7	~7	PA21		EIC/EXTINT[5] PTC/X[9] SERCOM5/PAD[3] SERCOM3/PAD[3] TC7/WO[1] *TCC0/WO[7]
	Digital High			
8	~8	PA06		EIC/EXTINT[6] PTC/Y[4] ADC/AIN[6] AC/AIN[2] SERCOM0/PAD[2] *TCC1/WO[0]
9	~9	PA07		EIC/EXTINT[7] PTC/Y[5] DC/AIN[7] AC/AIN[3] SERCOM0/PAD[3] *TCC1/WO[1]
10	~10	PA18		EIC/EXTINT[2] PTC/X[6] SERCOM1/PAD[2] SERCOM3/PAD[2] *TC3/WO[0] TCC0/WO[2]
11	~11	PA16		EIC/EXTINT[0] PTC/X[4] SERCOM1/PAD[0] SERCOM3/PAD[0] *TCC2/WO[0] TCC0/WO[6]
12	~12	PA19		EIC/EXTINT[3] PTC/X[7] SERCOM1/PAD[3] SERCOM3/PAD[3] *TC3/WO[1] TCC0/WO[3]
13	~13	PA17	LED	EIC/EXTINT[1] PTC/X[5] SERCOM1/PAD[1] SERCOM3/PAD[1] *TCC2/WO[1] TCC0/WO[7]
14	GND			
15	AREF	PA03		*DAC/VREFP PTC/Y[1]
16	SDA	PA22		EIC/EXTINT[6] PTC/X[10] *SERCOM3/PAD[0] SERCOM5/PAD[0] TC4/WO[0] TCC0/WO[4]
17	SCL	PA23		EIC/EXTINT[7] PTC/X[11] *SERCOM3/PAD[1] SERCOM5/PAD[1] TC4/WO[1] TCC0/WO[5]
	SPI (Legacy ICSP)			
18	1	PA12	MISO	EIC/EXTINT[12] SERCOM2/PAD[0] *SERCOM4/PAD[0] TCC2/WO[0] TCC0/WO[6]
19	2		5V0	
20	3	PB11	SCK	EIC/EXTINT[11] *SERCOM4/PAD[3] TC5/WO[1] TCC0/WO[5]
21	4	PB10	MOSI	EIC/EXTINT[10] *SERCOM4/PAD[2] TC5/WO[0] TCC0/WO[4]
22	5		RESET	
23	6		GND	
	Analog Connector			
24	A0	PA02		EIC/EXTINT[2] *ADC/AIN[0] PTC/Y[0] DAC/VOUT
25	A1	PB08		EIC/EXTINT[8] *ADC/AIN[2] PTC/Y[14] SERCOM4/PAD[0] TC4/WO[0]
26	A2	PB09		EIC/EXTINT[9] *ADC/AIN[3] PTC/Y[15] SERCOM4/PAD[1] TC4/WO[1]
27	A3	PA04		EIC/EXTINT[4] *ADC/AIN[4] AC/AIN[0] PTC/Y[2] SERCOM0/PAD[0] TCC0/WO[0]
28	A4	PA05		EIC/EXTINT[5] *ADC/AIN[5] AC/AIN[1] PTC/Y[5] SERCOM0/PAD[1] TCC0/WO[1]
29	A5	PB02		EIC/EXTINT[2] *ADC/AIN[10] PTC/Y[8] SERCOM5/PAD[0] TC6/WO[0]

Reference

. https://store.arduino.cc/usa/arduino-m0

. http://www.mouser.tw/ProductDetail/Molex/105262-0002/?qs=IQwVXVmkiFIBK%2fDeZK%252bySg

. https://github.com/arduino-org/Arduino/blob/master/hardware/arduino/samd/variants/arduino_zero/variant.cpp