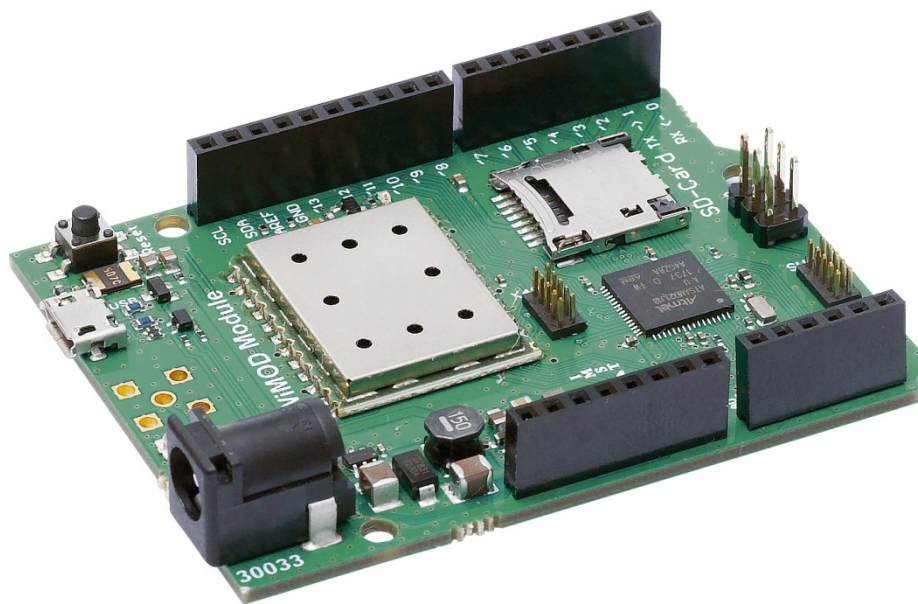


WiMODino

Datasheet



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IMST GmbH

Carl-Friedrich-Gauß-Str. 2-4

47475 KAMP-LINTFORT

GERMANY



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Aim of this Document

The aim of this document is to give a detailed product description including interfaces, features and performance of the device WiMODino.

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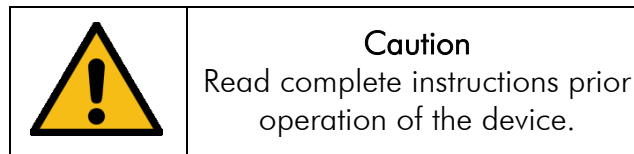


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1. Important User Information

This device is only for usage of professionals or authorized person.



In no event will IMST GmbH be responsible or liable for indirect or consequential damages resulting from use of this device.

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Warning: The WiMODino runs at 3.3V instead of 5V. The board could be damaged when applying voltages higher than 3.3V to any I/O pin.

2. Introduction

The WiMODino is an Arduino™ M0/Genuino Zero compatible board with an integrated radio module intended to be used in a variety of applications. It is fitted with a 32 bit ARM Cortex M0+ microcontroller, micro SD-Card holder and one of IMST's low power, bidirectional LoRa® radio module.

It is a platform for fast prototyping and easy evaluation of the WiMOD radio modules.

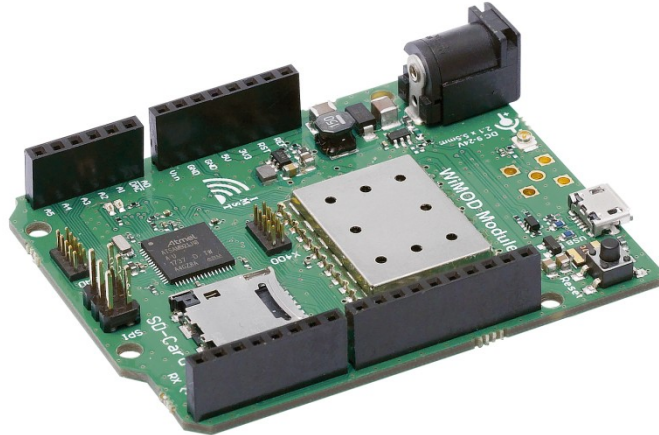


Figure 2-1: WiMODino

2.1 Key Features

- Compact size 54 x 69 x 15 mm
- LoRa® modulation technology
- Supplied by USB, external connector (9-24V DC) or pin header 5V/3.3V
- Internal switching regulator for 5V with max. 1.2A output current
- Internal switching regulator for 3.3V with max. 1.0A output current
- microSD-card holder
- U.FL. antenna connector
- Arduino-Zero hardware and software compatible
- LoRaWAN™ compliant to V1.0.1
- Certified according to
DIN EN 61000-4-2:2009
DIN EN 61000-4-3:2011
EN 55022:2011
ETSI EN300 220-2 V3.1.1
ETSI EN300 328 V2.1.1

2.2 Applications

- LoRa®/LoRaWAN™, IoT, Smart Cities
- Automated Meter Reading
- Wireless Networks
- Home-, Building-, Industrial automation
- Wireless Sensors
- Telemetry
- Wireless Alarm and Security Systems
- ...

Please visit our web site www.wireless-solutions.de for more information.

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2.3 Supported Radio Modules

Within the following table the supported radio modules are listed.

Module	LoRaWAN™ Protocol Stack	LR_Base Protocol Stack
iM880B	X	X
iM881A	X	X
iM980A	X	-
iM282A	-	X

Table 2-1: Supported radio modules and firmware

3. Device Overview

The WiMODino is a high-performance Arduino™ compatible board for easy usage of certified WiMOD radio modules. The radio modules can operate in the license free 868/915 MHz or 2.4 GHz SRD frequency band and include all necessary components and firmware for wireless communication. For detailed information about the installed WiMOD radio module please refer to the corresponding datasheet on <http://wireless-solutions.de>.

The WiMODino has an USB interface for configuration and development purposes and it comes preprogrammed with the bootloader for the Arduino™ M0 Pro. An external antenna can be attached to the U.FL. connector. In Figure 3-1 the main hardware components of the WiMODino are marked and in Figure 3-2 all available connectors are described.

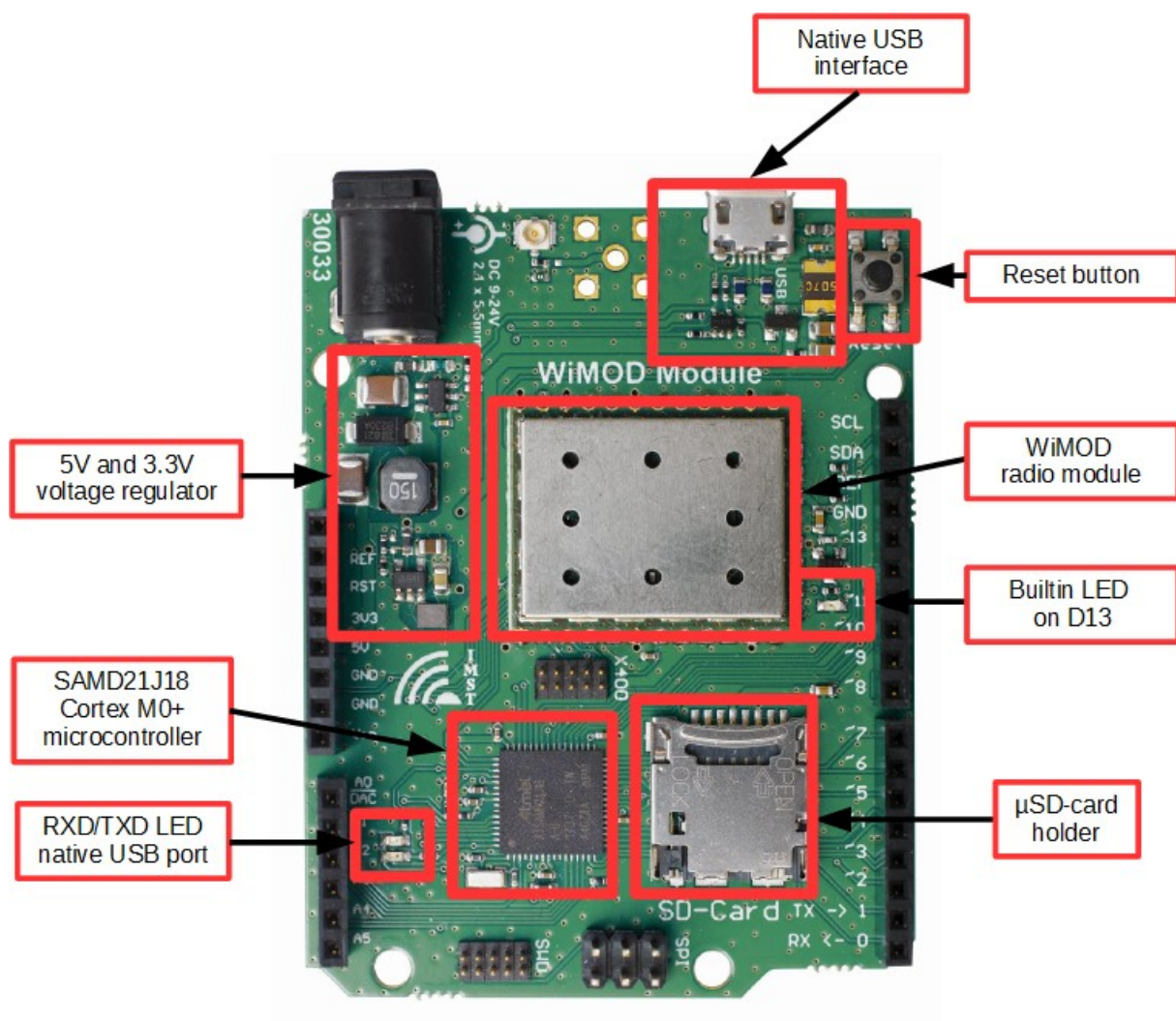


Figure 3-1: WiMODino Hardware Components

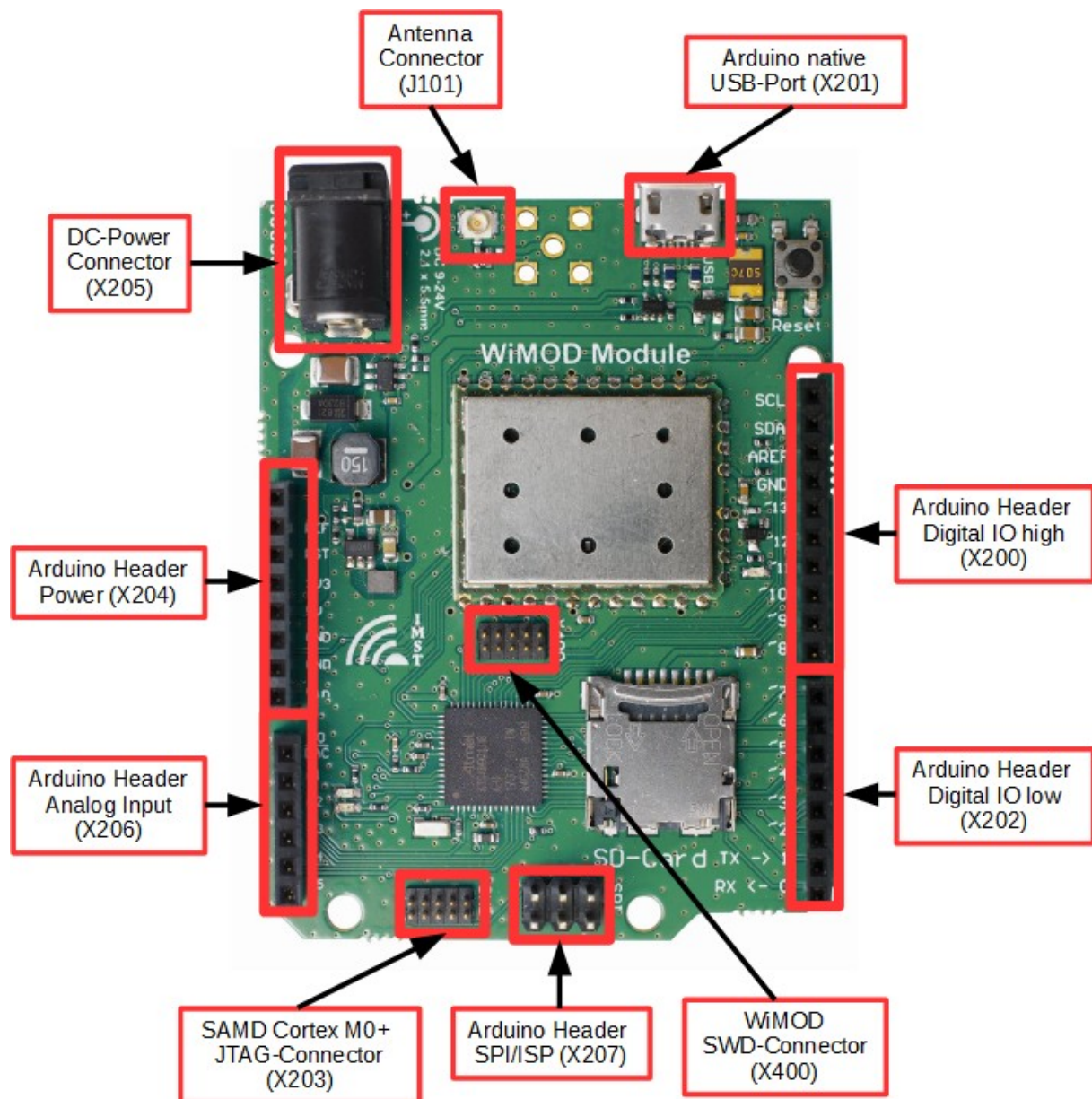


Figure 3-2: WiMODino Hardware Connectors

4. Technical Specification

For technical details of the used WiMOD radio module please have a look into the corresponding datasheet on <http://wireless-solutions.de>.

4.1 General Specification

Parameter	Min	Typ	Max	Unit
Input-Voltage DC-Plug	9	12	24	V
USB-Voltage	4.5	5	5.5	V
Power Consumption ¹	-	19	-	mA
Digital I/O Pins	-	14	-	-
PWM Outputs	-	12	-	-
Analog I/O Pins	-	6 + 1 DAC	-	-
DC Current per I/O Pin ²	-	-	7	mA
DC Current via USB	-	-	500	mA
Output current on board 5V regulator	-	-	1200	mA
Output current on board 3.3V regulator	-	-	1000	mA
Storage Temperature	-40	-	+85	°C
ESD contact discharge	-	-	±4	kV
ESD air discharge	-	-	±8	kV

Table 4-1: General specification

4.2 Arduino™ Specification

Parameter	Description
Microcontroller	ATSAMD21J18, 64 pin QFN
Architecture	ARM Cortex-M0+
Operating Value	3.3V
Flash memory	256KB
SRAM	32kB
Clock Speed	48MHz
Compatibility	Arduino™ M0 / M0 Pro

Table 4-2: Arduino specification

¹ With running example code "M0_UARTBridge" and iM282A in RX-mode

² For detailed information to the SAMD21-specific parameters please refer to the corresponding SAMD21 datasheet

5. Pin-out Description

This chapter describes the different connectors of WiMODino.

5.1 Overview

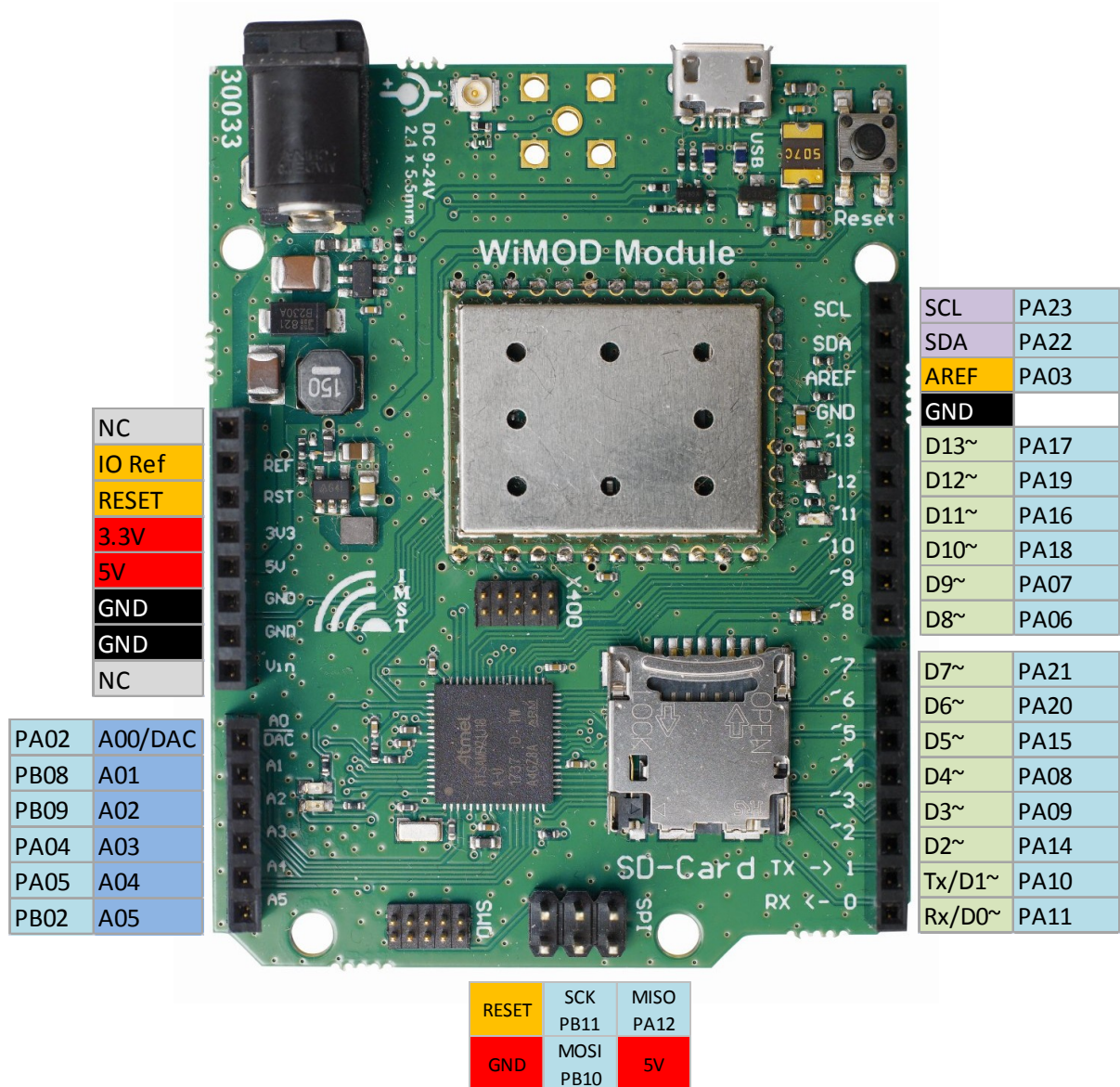


Figure 5-1: WiMODino pin-description

5.2 Arduino IOH-X200

X200 is the Arduino socket for the higher digital IO's D8 to D13, analog reference input and the I2C interface.

Pin	Name	ATSAMD21 Pin	Description
1	D8	PA06	
2	D9	PA07	
3	D10	PA18	
4	D11	PA16	
5	D12	PA19	
6	D13	PA17	
7	GND	-	
8	AREF	PA03	
9	SDA	PA22	
10	SCL	PA23	

Table 5-1: Pin-description X204

5.3 Arduino IOL-X202

X202 is the Arduino socket for the lower digital IO's D0 to D7.

Pin	Name	ATSAMD21 Pin	Description
1	D0	PA11	
2	D1	PA10	
3	D2	PA14	
4	D3	PA09	
5	D4	PA08	
6	D5	PA15	
7	D6	PA20	
8	D7	PA21	

Table 5-2: Pin-description X202

5.4 Arduino Power-X204

X204 is the Arduino socket for the power supply.

Pin	Name	ATSAMD21 Pin	Description
1	Reserved	-	
2	IOREF	-	Connected to 3.3V
3	nReset	NRESET	
4	3V3	-	3.3V input/output, connected to output of internal 3.3V voltage regulator
5	5V	-	5V input/output, connected to USB and 3.3V regulator input
6	GND	-	
7	GND	-	
8	VIN	-	Connected to power supply jack

Table 5-3: Pin-description X204

5.5 Arduino ADC-X206

X206 is the Arduino socket for the analog IO's A0 to A5.

Pin	Name	ATSAMD21 Pin	Description
1	A0-DAC	PA02	
2	A1	PB08	
3	A2	PB09	
4	A3	PA04	
5	A4	PA05	
6	A5	PB02	

Table 5-4: Pin-description X206

5.6 Arduino ICSP-X207

X207 is the Arduino ICSP header for Arduino's SPI interface.

! Signal level should not exceed 3.3V !

Pin	Name	ATSAMD21 Pin	Description
1	MISO	PA12	Arduino SPI MISO line
2	5V	-	
3	SCK	PB11	Arduino SPI SCK line
4	MOSI	PB10	Arduino SPI MOSI line
5	nReset	NRESET	
6	GND	-	

Table 5-5: Pin-description X207

5.7 SAMD21 SWD Programming Connector X203

X203 is the programming header for the ATSAMD21J18.

Pin	Name	ATSAMD21 Pin	Description
1	Vcc	Vcc	
2	SWDIO	PA31 / SWDIO	
3	GND	GND	
4	SWCLK	PA30 / SWCLK	
5	GND	GND	
6	SWO	not connected	
7	N/U	not connected	
8	N/U	not connected	
9	GND	GND	
10	RESET	RESET	

Table 5-6: Pin-description X203

5.8 WiMOD Module Connections

WiMOD Pin	ATSAMD21 Pin	Description / Symbolic name within the Arduino IDE
P7-#RESET	PB05	PIN_WIMOD_NRST
P8-CTS	PB23	PIN_WIMOD_CTS
P9-RTS	PB22	PIN_WIMOD_RTS
P12-SW2	PB15	PIN_WIMOD_SW2
P13-SW1	PB14	PIN_WIMOD_SW1
P14-SW3	PB16	PIN_WIMOD_SW3
P18-RXD	PB30	PIN_WIMOD_UART_RX ; use "SerialWiMOD" as interface inside .ino
P19-TXD	PB31	PIN_WIMOD_UART_TX; use "SerialWiMOD" as interface inside .ino
P20-LED4	PB13	PIN_WIMOD_LED4
P24-LED3	PB12	PIN_WIMOD_LED3
P25-LED2	PB00	PIN_WIMOD_LED2
P26-Boot	PB04	PIN_WIMOD_BOOT
P29-LED1	PB01	PIN_WIMOD_LED1

Table 5-7: Description of WiMOD module connections

5.9 WIMOD SWD Programming Connector X400

Pin	Name	WiMOD Pin	Description
1	Vcc	Vcc	
2	SWDIO	P3 / SWDAT	
3	GND	GND	
4	SWCLK	P2 / SWCLK	
5	GND	GND	
6	SWO	not connected	
7	N/U	not connected	
8	N/U	not connected	
9	GND	GND	
10	RESET	P7 / RESET	

Table 5-8: Pin description X203

5.10 Micro-SD Card Connections

μSD-Card	ATSAMD21 Pin	Description
SCK	PB11	
MOSI	PB10	
MISO	PA12	
CS	PA13	Chip select for the micro SD card SPI interface. (PIN_USD_CARD_CS)
CD	PB17	Card detect signal from micro SD card holder. (PIN_USD_CARD_CD)

Table 5-9: Description of micro-SD card connections

6. Ordering Information

Name/Part Number	Description	Weight	Distributor
WiMODino-iM880B/ Art.Nr.: 404804	WiMODino with LoRa® Module iM880B	Tbd.	sales@imst.de webshop.imst.de
WiMODino-iM881A/ Art.Nr.: 404803	WiMODino with LoRa® Module iM881A	Tbd.	sales@imst.de webshop.imst.de
WiMODino-iM282A/ Art.Nr.: 404814	WiMODino with LoRa® Module iM282A	Tbd.	sales@imst.de webshop.imst.de
Related Components			
iM880B-L LR_BASE/Art.Nr.: 404785 iM880B-L LoRaWAN™/Art.Nr.: 404791	LoRa® Module with LR_BASE SW LoRa® Module with LoRaWAN™ SW	Tbd.	sales@imst.de webshop.imst.de
iM881A-M LR_BASE/Art.Nr.: 404771 iM881A-XL LoRaWAN™/Art.Nr.: 404774	LoRa® Module with LR_BASE SW LoRa® Module with LoRaWAN™ SW	Tbd.	sales@imst.de webshop.imst.de
iM282A-L LR_BASE PLUS/Art.Nr.: 404744	LoRa® Module with LR_BASE Plus SW	Tbd.	sales@imst.de webshop.imst.de

Table 6-1: Ordering Information

7. Appendix

7.1 List of Abbreviations

ADC	Analog-to-Digital Converter
CW	Continuous Wave
GND	Ground
GPIO	General Purpose Input/Output
I ² C	Inter-Integrated Circuit
MCU	Microcontroller Unit
PCB	Printed Circuit Board
RAM	Random Access Memory
RF	Radio Frequency
SMBus	System Management Bus
SMT	Surface Mounted Technology
SPI	Serial Peripheral Interface
TRX	Transceiver
USB	Universal Serial Bus



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8. Restrictions and Limitations

8.1 Hardware Restrictions and Limitations

The characteristic values given by the present document are typically obtained by measurements based on evaluation kits of the entitled module. Using other carrier boards or connected equipment might lead to different characteristics. Subject to given measurement results the characteristic values might show the best performance of the entitled device, independent from any compliancy restriction of final operation purposes.

8.2 Software Restrictions and Limitations

The present document is a datasheet of the entitled device which intentional use is to provide information about basic characteristics related to the device hardware. Typically all described characteristic values require software for obtaining them accordingly. All features of the available software are subject to changes without claim to be complete at any time. Characteristically values might also be provided based on datasheets of the appropriate key components unless there are test results available based on the available software. For more information regarding current supported features of the available software refer to www.wireless-solutions.de.

8.3 Compliancy Restrictions and Limitations

The entitled device has been designed to comply with the standards namely given in the present document. The intentional operation shall be in so called ISM bands, which can be used free of charge within the European Union and typically licences free all over the world. Nevertheless, restrictions such as maximum allowed radiated RF power or duty cycle may apply which might result in a reduction of these parameters accordingly.

In addition, the use of radio frequencies might be limited by national regulations which requirements also need to be met.

In case the entitled device will be embedded into other products (referred as "final products"), the manufacturer for this final product is responsible to declare the conformity to required standards accordingly. A proof of conformity for the entitled device is available from IMST GmbH on request. Beside the entitled device the conformity also considers software as well as supporting hardware characteristics which might also have an impact accordingly.

The applicable regulation requirements are subject to change. IMST GmbH does not take any responsibility for the correctness and accuracy of the aforementioned information. National laws and regulations, as well as their interpretation can vary with the country. In case of uncertainty, it is recommended to contact either IMST's accredited Test Center or to consult the local authorities of the relevant countries.

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9.2 Contact Information

IMST GmbH

Carl-Friedrich-Gauss-Str. 2-4
47475 Kamp-Lintfort
Germany

T +49 2842 981 0 E sales@imst.de
F +49 2842 981 299 I www.wireless-solutions.de

