## LoRaWAN<sup>TM</sup> Concentrator Card Mini PCle LRWCCx-MPCIE-xxx





# LoRaWAN® Concentrator Card based on Semtech SX1301 and SX1308 Chips in Mini PCle Form Factor

The n-fuse LRWCCx-MPCIE family of cards enable OEMs and system integrators to build high-performance, certified LoRaWAN® gateway solutions. Moreover it allows to retofit existing routers and other edge-level network equipment with LoRaWAN® gateway capabilities.

#### **Key Features**

- Compact size
- Broad usage spectrum through standard mini PCle form factor
- USB host interface (through mini PCle) or UART
- SX1301/ SX1308 digital base band processor with dual SX1257 Tx/ Rx front-ends
- Output power level up to 21 dBm
- Firmware upgradeable via USB DFU

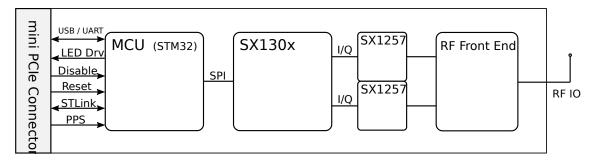
#### **Application Areas**

- Internet of Things (IoT) and Industrial Internet of Things (IIoT) Applications
- Machine to Machine (M2M)
- Smart City
- Agricultural Monitoring
- Home-, Building-, Industrial Monitoring and Control
- Remote Control
- Wireless Alarm and Security Systems
- Tracking Applications

# **Specifications**

Category	Feature	Description	
General Radio	Semtech Radios	SX1301/ SX1308 and 2x SX1257	
Connectors	Connector Type	Mini PCI Express (full length)	
	External Antenna	U.FL connector 50 $\Omega$ impedance	
Host Interface		USB Version 2 or greater (default) UART with alternative firmware	
Power	Input Voltage	3.3 VDC +/- 5%	
	Consumption	TX (max): 450 mA RX (all channels): 340 mA Idle: 40 mA	
RF	Frequency Range	863 to 870 MHz <sup>a</sup> 915 to 928 MHz <sup>b</sup>	
	Sensitivity	a	
		Up to -124 dBm at SF7, BW 125 KHz Up to -138 dBm at SF12, BW 125 kHz	
		Up to -125 dBm at SF7, BW 125 KHz Up to -139 dBm at SF12, BW 125 kHz	
	Max RF Output Power	Up to +21 dBm	
Modulation	LoRa®		
Status Indication	LEDs, green	Rx Tx	
Host Software	HAL user space driver	https://github.com/Lora-net/picoGW_hal	
	Packet forwarder	https://github.com/Lora-net/picoGW_packet_forwarder	
Firmware	For MCU (STM32)	https://github.com/Lora-net/picoGW_mcu Variants for USB/ CDC and UART available. Note that the UART variant is not mini PCle compatible.	
Operating Conditions	Temperature (operating)	-40 to +75 $^{\circ}$ C $^{1}$ -40 to +70 $^{\circ}$ C $^{2}$ The Tx power rises with lower temperatures. It might be necessary to limiting the TX power to comply with your regulatory domain.	
	Humidity	10% ~ 90% RH Non-condensing	
Physical Properties	Dimensions WxHxD	51 x 30 x 4.8 mm (device) 51 x 30 x 1 mm (PCB)	
	Weight	9 g	
Regulatory	Certifications	CE (Radio Equipment Directive 2014/53/EU) <sup>a</sup> FCC (FCC ID: 2AY53LRWCC1915) <sup>b</sup> LoRa <sup>®</sup> Alliance <sup>a, b</sup>	
	Materials	RoHS, REACH	
Warranty		12 months for B2B customers 24 months for B2C customers	

# Block Diagram



## Interfaces

#### Mini-PCle Connector

The concentrator card is compliant with the mini PCle specification and can thus be used in any compatible host system. Some reserved pins are used and others re-purposed as shown in the following table.

Pin #	Symbol	Туре	Description
1	NC	-	
2	VCC	power	
3	NC	-	
4	GND	power	
5	PPS	input	Pulse per second signal usually from GNSS devices for accurate timing.
6	NC	-	
7	NC	-	
8	NC	-	
9	GND	power	
10	SWDIO	input/ output	STLink serial I/O line
11	NC	-	
12	SWCLK	input	STLink clock
13	NC	-	
14	NC	-	
15	GND	power	
16	воото	input	MCU boot0 signal
17	NC	-	
18	GND	power	
19	NC	-	
20	nDISABLE	input	Low active radio disable
21	GND	power	
22	nRESET	input	Low active MCU reset signal
23	NC	-	

Pin #	Symbol	Туре	Description
24	VCC	power	
25	NC	-	
26	GND	power	
27	GND	power	
28	NC	-	
29	GND	power	
30	NC	-	
31	NC	-	
32	NC	-	
33	NC	-	
34	GND	power	
35	GND	power	
36	USB_D- / Tx	input/ output	USB data - / UART Tx
37	GND	power	
38	USB_D+ / Rx	input/ output	USB data + / UART Rx
39	VCC	power	
40	GND	power	
41	VCC	power	
42	nTX	output	Open drain LED driver for Tx indication
43	GND	power	
44	nRX	output	Open drain LED driver for Rx indication
45	NC	-	
46	NC	-	
47	NC	-	
48	NC	-	
49	NC	-	
50	GND	power	
51	NC	-	
52	VCC	power	

NC = Not Connected VCC = 3.3 V Power Supply GND = Ground

#### RF IO Port

The RF IO port is a U.FI type connector for the connection to the antenna. Usually a 'pigtail' cable with a U.FI to SMA or N-Type connector is used for this.

① Note: that the device must not be used without a proper 50 Ohm load on the RF IO port.

#### **Product Family Portfolio**

Part Number	Description	Availability
Irwcc8-mpcie-868	SX1308 based 868 MHz variant	available
Irwcc8-mpcie-915	SX1308 based 915 MHz variant	available
lrwcc1-mpcie-868	SX1301 based 868 MHz variant	available
Irwcc1-mpcie-915	SX1301 based 915 MHz variant	available
Irwccx-mpcie-433		upon request

#### Ordering Information

All n-fuse products can be ordered directly through the n-fuse website. You can also contact a sales representative via devices-sales@n-fuse.co for volume ordering.

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