

LoRaWAN® Concentrator Card based on Semtech SX1303 Core Cell Design in Mini PCIe Form Factor

The n-fuse LRWCC3-MPCIE family of cards enable OEMs and system integrators to build high-performance, certified LoRaWAN® gateway solutions. Moreover it allows to retrofit existing routers and other edge-level network equipment with LoRaWAN® gateway capabilities.

Key Features

- Compact size
- Broad usage spectrum through standard mini PCIe form factor
- USB host interface (through mini PCIe) or UART
- Alternative SPI/I2C/GPIO host interface (non mini PCIe compatible)
- SX1302/3 digital base band proc. and 2x SX1250 and 1x SX1261 Tx/ Rx front-ends
- Listen before talk
- Output power level up to +27 dBm
- Firmware upgradeable via USB DFU
- Low power consumption

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

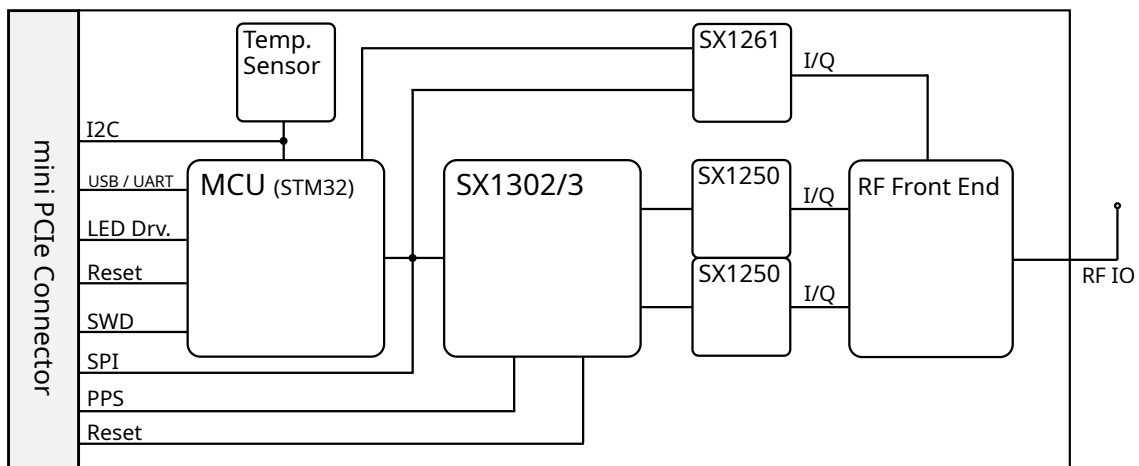
Specifications

Category	Feature	Description
General Radio	Semtech Radios	2x SX1250 and 1x SX1261
Connectors	Connector Type	Mini PCI Express (full length)
	External Antenna	U.FL connector 50 Ω impedance
Host Interface		USB version 2 or greater (default) SPI/ I2C/ GPIO
Power	Input Voltage	3.3 VDC +/- 5%
	Consumption	TX max, +27 dBm: 464 mA TX typical, +14 dBm: 209 mA RX (all channels): 50 mA Idle: 17 mA
RF	Frequency Range	863 to 870 MHz ^a 915 to 928 MHz ^b
	Sensitivity	^a less or equal than -125 dBm at SF7, BW 125KHz less or equal than -140 dBm at SF12, BW 125KHz ^b less or equal than -125 dBm at SF7, BW 125KHz less or equal than -140 dBm at SF12, BW 125KHz
	Max RF Output Power	Up to +27 dBm
Features	Fine Time Stamping ^c	Enabling Time Difference of Arrival (TDOA) network-based geolocation.
	Listen Before Talk	Prevents collisions while accessing the spectrum.
Modulation	LoRa [®]	
Status Indication	LEDs	Red: Rx Yellow: Tx Green: Config OK Power
Host Software	HAL User Space Driver and Packet Forwarder	https://github.com/Lora-net/sx1302_hal
Firmware	For MCU (STM32)	USB: https://github.com/Lora-net/sx1302_hal/tree/master/mcu_bin

Category	Feature	Description
Operating Conditions	Temperature (operating)	-40 to +85° C The Tx power rises with lower temperatures but is automatically compensated.
	Humidity	10% ~ 90% RH Non-condensing
Physical Properties	Dimensions WxHxD	51 x 30 x 4 mm (device) 51 x 30 x 1 mm (PCB)
	Weight	9 g
Regulatory	Certifications	CE (Radio Equipment Directive 2014/53/EU) ^a FCC ID: 2AY53LRWCC3915 ^b ISED IC: 27239-LRWCC3915 ^b
	Materials	RoHS, REACH
Warranty		12 months for B2B customers 24 months for B2C customers

^a for 868 Mhz, ^b for 915 Mhz, ^c SX1303 only

Block Diagram



Interfaces

Mini-PCIe Connector

The concentrator card is compliant with the mini PCIe 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	Type	Description
1	NC	-	
2	VCC	power	
3	NC	-	
4	GND	power	
5	NC	-	
6	GPIO6	Input/ output	General purpose IO from MCU

Pin #	Symbol	Type	Description
7	NC	-	
8	NC	-	
9	GND	power	
10	NC	-	
11	NC	-	
12	NC	-	
13	NC	-	
14	NC	-	
15	GND	power	
16	NC	-	
17	HOST_SCK	input	SPI clock
18	GND	power	
19	HOST_MISO	output	SPI MISO
20	NC	-	
21	GND	power	
22	SX130x_RESET	input	SX130x reset signal (active high)
23	HOST_MOSI	input	SPI MOSI
24	VCC	power	
25	HOST_CSN	input	SPI CSN
26	GND	power	
27	GND	power	
28	SX130x_GPIO_8	input	SX130x GPIO8
29	GND	power	
30	I2C_SCL	input	MCU/ temperature sensor I2C bus clock
31	PPS	input	Pulse per second signal usually from GNSS devices for accurate timing.
32	I2C_SDA	input/ output	MCU/ temperature sensor I2C bus data
33	NC	-	
34	GND	power	
35	GND	power	
36	USB_D- / Tx	input/ output	USB data - / UART Rx
37	GND	power	
38	USB_D+ / Rx	input/ output	USB data + / UART Tx
39	VCC	power	
40	GND	power	
41	VCC	power	
42	NC	-	
43	GND	power	

Pin #	Symbol	Type	Description
44	SX1261_NSS	input	SX1261 SPI NSS
45	SWCLK	input	STLink clock
46	SX1261_DIO1	input	SX1261 DIO1
47	SWDIO	input/ output	STLink serial I/O line
48	SX1261_NRESET	input	SX1261 reset signal (active low, on device pull-up)
49	MCU_NRESET	input	MCU reset signal (active low, on device pull-up)
50	GND	power	
51	MCU_BOOT0	Inout	MCU boot0 signal (active high, on device pull-down)
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.

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

Product Family Portfolio

The lrwcc3-mpcie-s-xxx parts come without the STM32 MCU and can thus be only driven by SPI/ I2C/ GPIO.

Part Number	Description	Availability
lrwcc2-mpcie-868	SX1302 based 868 MHz variant	discontinued
lrwcc2-mpcie-915	SX1302 based 915 MHz variant	discontinued
lrwcc3-mpcie-868	SX1303 based 868 MHz variant	available
lrwcc3-mpcie-915	SX1303 based 915 MHz variant	available
lrwcc3-mpcie-s-868	SX1303 based 868 MHz, SPI variant	available
lrwcc3-mpcie-s-915	SX1303 based 915 MHz, SPI variant	available
lrwcc3-mpcie-433	SX1303 based 433 MHz variants	available

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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