RAK833-SPI

LoRa Gateway Concentrator Module Mini PCIe

Lowest Cost Solution for LoRa Module

INDUSTRIAL GRADE

868MHz/915MHz

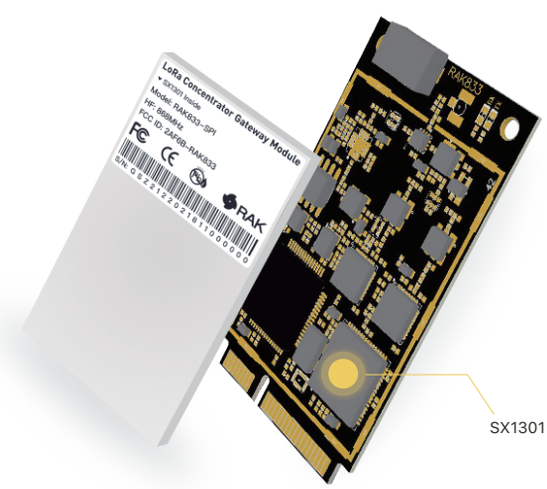
LoRa Gateway Concentrator Module RAK833-SPIbased on Semtech SX1301 Chips in Mini PCIe Form Factor

RAK833-SPI 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.

RAK833-SPI is complete and cost efficient LoRa gateway solution offering up to 10 programmable parallel demodulation paths. It targeted at smart metering fixed networks and IoT applications with up to 500 nodes per km^2 in moderately interfered environment.

The modules have the industry standard PCI Express Mini Card form factor, which enables easy integration into an application board and is also ideal for manufacturing of small series.

RAK833-SPI refer Semtech's reference design of SX1301, communicate with Host through SPI transfer interface.



A SPI interface is provided on the PCIe_SCK, PCIe_MISO, PCIe_MOSI, PCIe_CSN, PCIe_RST(Reset) pins of the system connector. The SPI interface gives access to the configuration register of SX1301 via a synchronous full-duplex protocol. Only the slave side is implemented.

Key Features

- Compact size
- Frequency band 868MHz & 915MHZ
- Standard Mini PCI-e form factor with 52Pin
- Voltage of Mini PCI-e is 3.3v which compatible with 3G/LTE card of mini-PCIe type
- Max. Tx power is 25dbm & sensitivity -136.5dbm
- Interfaces SPI (through mini PCIe)
- sx1301 base band processor emulates 49 x lora demodulators 10 parallel demodulation paths

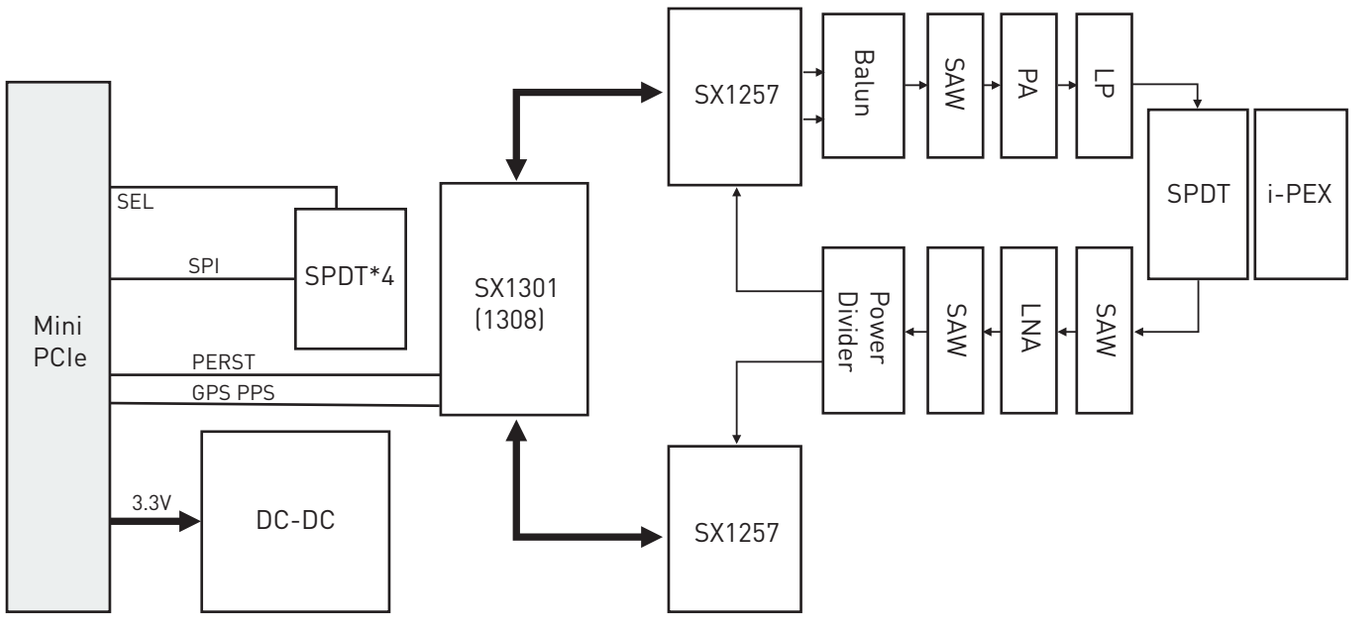
Application Areas

- 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

Gategory	Feature	Description
Name		RAK833-SPI
General Radio	Semetech Radio	SX1301
Connectors	Connector Type	Mini PCI Express (full length)
	External Antenna	High gain antenna (Optional)
Host Interface		SPI
mPCIe Compatibility		Standard Mini PCI-e form factor with 52Pin
Power	Input Voltage	DC 3.3 ± 5%
	Consumption	TX (max): 135 mA
		RX (all channels): 260 mA
		Idle: 71 mA
RF	Frequency Range	865 to 872MHz
		902 to 928MHz
	RX Sensitivity	Up to -124dBm at SF7, BW 125KHz
		Up to -136.5dBm at SF12, BW 125KHz
	Max RF Output	Up to +25 dBm
	Mean RF Output	Up to +23 dBm
Status Indication	LEDs, Red	TX, RX
Operating Conditions	Temperatur	-48 to +85° C
Size	WxHxD	50.95 x 30 x 4.5 mm (PCB)

Block Diagram



Interface

Mini PCIe Connector

Pin #	Symbol	Type	Description
1	NC	-	
2	3.3Vaux	MPCI supply input	Connect to external 3.3 V supply.
3	NC	-	
4	GND	Ground	
5	NC	-	
6	NC	-	
7	NC	-	
8	NC	-	
9	GND	Ground	Connect to ground
10	NC	-	
11	NC	-	
12	NC	-	
13	NC	-	
14	NC	-	
15	GND	Ground	Connect to ground
16	NC	-	
17	SPDT_SEL	-	
18	GND	Ground	Connect to ground
19	GPS_PPS	-	

Pin #	Symbol	Type	Description
20	NC	-	
21	GND	Ground	Connect to ground
22	RESET	MPCI reset input	Active high for SX1301 reset
23	NC	-	
24	3.3Vaux	MPCI supply input	Connect to external 3.3 V supply
25	NC	-	
26	GND	Ground	Connect to ground
27	GND	-	Connect to ground
28	NC	-	
29	GND	Ground	Connect to ground
30	NC	-	
31	NC	-	
32	NC	-	
33	NC	-	
34	GND	Ground	Connect to ground
35	GND	Ground	Connect to ground
36	NC	-	
37	GND	Ground	Connect to ground
38	NC	-	
39	3.3Vaux	MPCI supply input	Connect to external 3.3 V supply.
40	GND	Ground	Connect to ground
41	3.3Vaux	MPCI supply input	Connect to external 3.3 V supply.
42	NC	-	
43	GND	Ground	Connect to ground
44	NC	-	
45	PCIe_SCK	Host SPI interface	Max 10MHz clock
46	NC	-	
47	PCIe_MISO	Host SPI interface	
48	NC	-	
49	PCIe_MOSI	Host SPI interface	
50	GND	Ground	Connect to ground
51	PCIe_CSN	Host SPI interface	
52	3.3VAux	MPCI supply input	Connect to external 3.3 V supply.

Product Portfolio

Part Number	Type	Host Interface	Description
RAK833-SPI-868	SX1301 based 868 MHz variant	SPI	Q3 2018
RAK833-SPI-915	SX1301 based 915 MHz variant	SPI	Q1 2019