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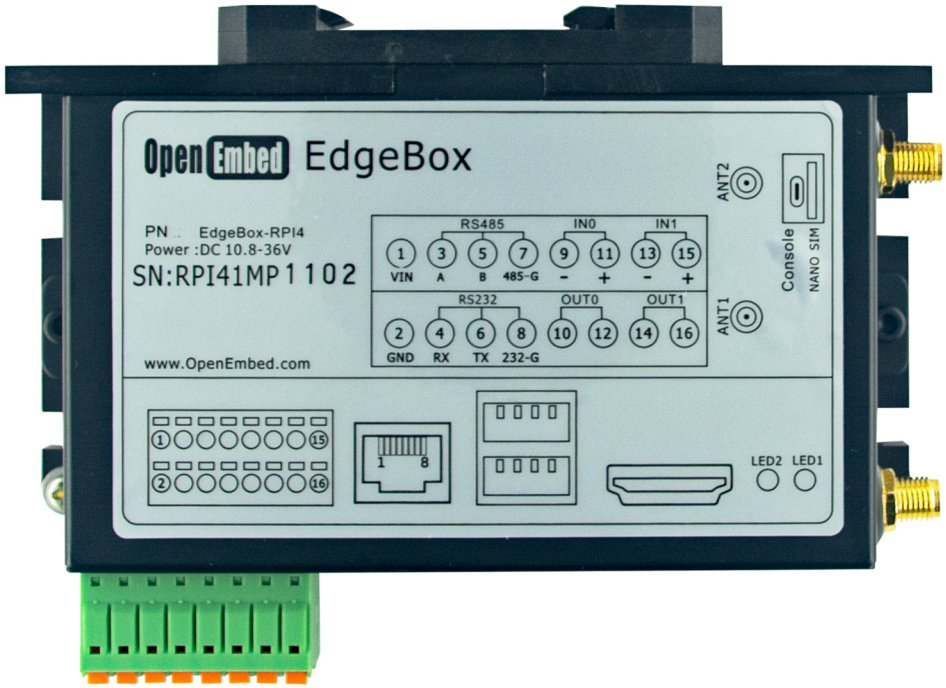
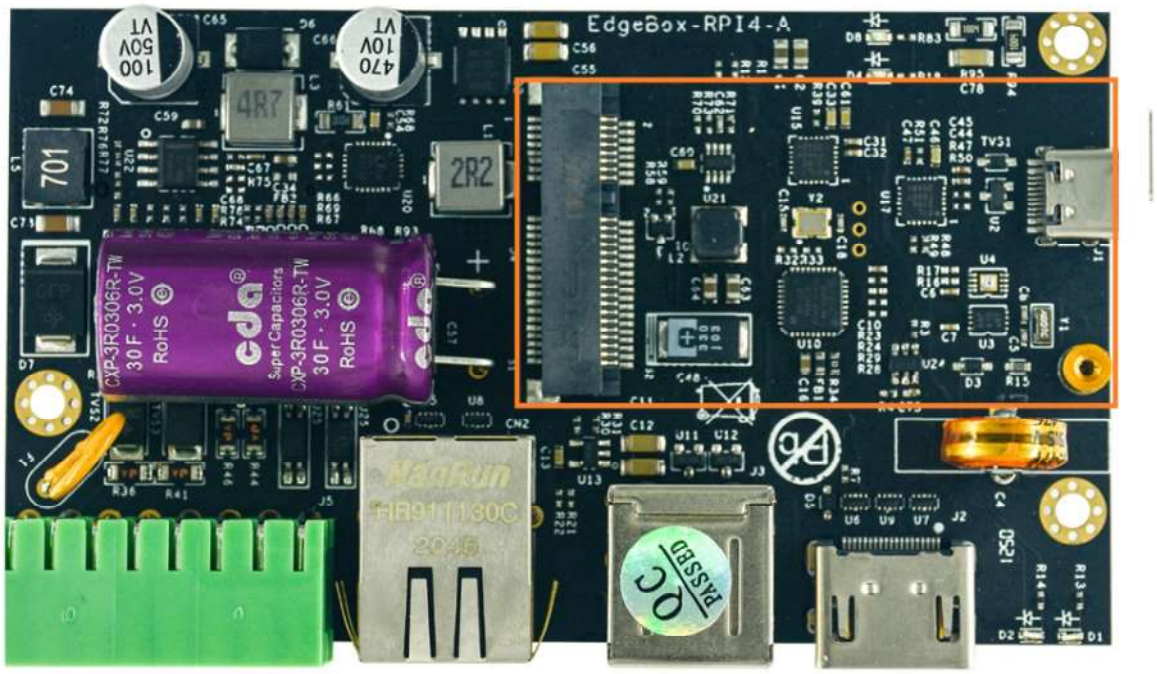
一.Background

The LoRaWAN® specification is a Low Power, Wide Area (LPWA) networking protocol designed to wirelessly connect battery operated 'things' to the internet in regional, national or global networks, and targets key Internet of Things (IoT) requirements such as bi-directional communication, end-to-end security, mobility and localization services.
The application note descripte how to deploy a LoraWAN server on EdgeBox-RKPI4.
There are 2 tunnels of communication in the Mini PCIe socket. One is USB for 4G/LTE, the other SPI for LoraWAN,we only use SPI tunnel in loraWAN card.

NOTE: The card use PIN22 of Mini PCIe to reset the whole hardware, it is a HIGH active signal. It is different for most 4G/LTE card with A LOW active signal.
The orange area is the rough Mini-PCIe add-on card position,only one M2x5 screw is needed.

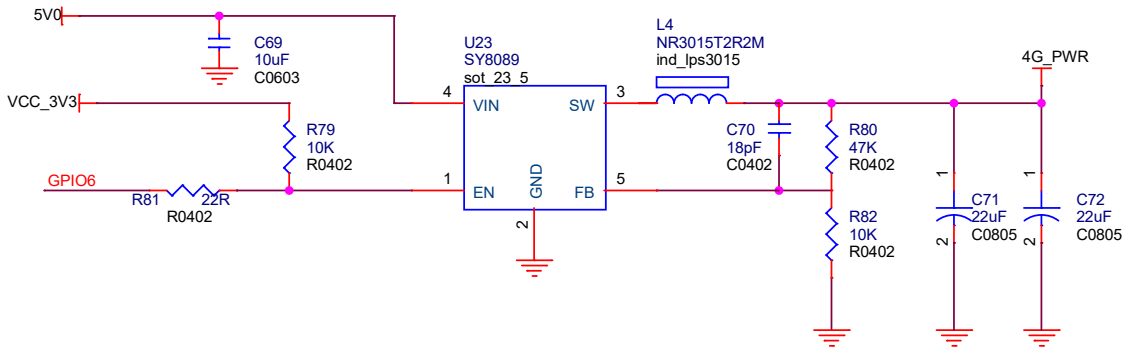




Signal	PIN#	PIN#	Signal
	1	2	4G_PWR
	3	4	GND
	5	6	USIM_PWR
	7	8	USIM_PWR
GND	9	10	USIM_DATA
	11	12	USIM_CLK
	13	14	USIM_RESET#
GND	15	16	
	17	18	GND
	19	20	
GND	21	22	PERST#

	23	24	4G_PWR
	25	26	GND
GND	27	28	
GND	29	30	UART_PCIE_TX
	31	32	UART_PCIE_RX
	33	34	GND
GND	35	36	USB_DM
GND	37	38	USB_DP
4G_PWR	39	40	GND
4G_PWR	41	42	4G_LED
GND	43	44	USIM_DET
SPI1_SCK	45	46	
SPI1_MISO	47	48	
SPI1_MOSI	49	50	GND
SPI1_SS	51	52	4G_PWR

NOTE : 4G_PWR is the individual power supply for Mini-PCIe card . It can be shut down or turn on by the GPIO6 of CM4,the control signal is high active.



二 .Steps

1. Insert the SX1302 card,connect the antenna.

Note : The loraWAN is deployed in the different frequency in different area of the world.it is 868Mhz in EU and 915 in north America.

2. Download the zip file
3. Change the “SX1302_RESET_PIN=7” to “SX1302_RESET_PIN=5” and change the reset signal.

```
#!/bin/sh

# This script is intended to be used on SX1302 CoreCell platform, it performs
# the following actions:
#       - export/unpexort GPIO7 used to reset the SX1302 chip
#
# Usage examples:
#       ./reset_lgw.sh stop
#       ./reset_lgw.sh start

# GPIO mapping has to be adapted with HW
#

SX1302_RESET_PIN=5

WAIT_GPIO() {
    sleep 0.1
}

init() {
    # setup GPIOs
    echo "$SX1302_RESET_PIN" > /sys/class/gpio/export; WAIT_GPIO
```

```
    sleep 0.1
}

init() {
    # setup GPIOs
    echo "$SX1302_RESET_PIN" > /sys/class/gpio/export; WAIT_GPIO

    # set GPIOs as output
    echo "out" > /sys/class/gpio/gpio$SX1302_RESET_PIN/direction; WAIT_GPIO
}

reset() {
    echo "CoreCell reset through GPIO$SX1302_RESET_PIN..."

    # write output for SX1302 CoreCell reset
    echo "1" > /sys/class/gpio/gpio$SX1302_RESET_PIN/value; WAIT_GPIO
    echo "0" > /sys/class/gpio/gpio$SX1302_RESET_PIN/value; WAIT_GPIO
}

term() {
    # cleanup all GPIOs
    if [ -d /sys/class/gpio/gpio$SX1302_RESET_PIN ]
    then
```

4. Enter libloragw and make.
5. Run ./test_loragw_reg to test

```
pi@raspberrypi:~/Documents/gw1302s-master/gw1302s-master/libloragw$ ./test_loragw_reg
CoreCell reset through GPIO5...
## TEST#1: read all registers and check default value for non-read-only registers
------------------
 TEST#1 PASSED
------------------

## TEST#2: read/write test on all non-read-only, non-pulse, non-w0clr, non-w1clr registers
------------------
 TEST#2 PASSED
------------------

CoreCell reset through GPIO5...
pi@raspberrypi:~/Documents/gw1302s-master/gw1302s-master/libloragw$
```

6. Run ./test_loragw_hal_tx -r 1250 -f 480.1 -m LORA -b 125 -s 12 -z 20 to transmit

```
pi@raspberrypi:~/Documents/gw1302s-master/gw1302s-master/libloragw$ ./test_loragw_hal_tx -r 1250 -f
 480.1 -m LORA -b 125 -s 12 -z 20
Sending 1 LoRa packets on 480100000 Hz (BW 125 kHz, SF 12, CR 1, 20 bytes payload, 8 symbols preamb
le, explicit header, non-inverted polarity) at 0 dBm
CoreCell reset through GPIO5...
TX done

Nb packets sent: 1 (1)
CoreCell reset through GPIO5...
=========== Test End ===========
pi@raspberrypi:~/Documents/gw1302s-master/gw1302s-master/libloragw$
```

7. Run ./test_loragw_hal_rx -r 1250 -a 475.5 -b 476.5 to receive

```
pi@raspberrypi:~/Documents/gw1302s-master/gw1302s-master/libloragw$ ./test_loragw_hal_rx -r 1250 -a
 475.5 -b 476.5
===== sx1302 HAL RX test =====
INFO: rxpkt buffer size is set to 16
INFO: Select channel mode 0
CoreCell reset through GPIO5...
Waiting for packets...

^C
Nb valid packets received: 0 CRC OK (1)
CoreCell reset through GPIO5...
=========== Test End ===========
pi@raspberrypi:~/Documents/gw1302s-master/gw1302s-master/libloragw$
```

NOTE: A transmitting node is need in receive test mode