RS9113 n-Link™ module

EVB User Guide

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About this Document

The RS9113 n-Link module is Redpine Signals ultra-low-power, single spatial stream, dual-band 802.11n + BT4.0 + Zigbee Convergence SoC based evaluation platform. The RS9113 module is mounted on the EVB along with other supporting components including a 40MHz reference oscillator, antenna and other passive components. This document describes evaluating procedures for RS9113 n-Link module EVB on any Linux/Android operating platforms for Wi-Fi, BT and Zigbee features.

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1. Overview

The RS9113 n-Link module is based on Redpine Signals' RS9113 ultra-low-power, single spatial stream, dual-band 802.11n + BT4.0 +Zigbee Convergence SoC The RS9113 n-Link module provides low-cost CMOS integration of a multi-threaded MAC processor, baseband digital signal processing, analog front-end, crystal oscillator, calibration OTP, dual-band RF transceiver, dual-band high-power amplifiers, baluns, diplexers, diversity switch and Quad-SPI Flash thus providing a fully-integrated solution for a range of embedded wireless applications. The M2MCombo™ (RS9113) chips and modules provide WLAN 802.11n, BT4.0 and Zigbee convergence solution for integration into mobile and M2M communication devices. With Redpine's embedded four-threaded processor and on-chip ROM and RAM, these modules enable integration into low-host and zero host load applications. The RS9113 module is mounted on the EVB along with other supporting components including a 40MHz reference oscillator, antenna and other passive components. It can connect to a host processor through SDIO or USB.

This document describes usage of the Redpine RS9113 n-Link evaluation board. The sequence of commands and set-up requirements are described in relevant sections to quickly evaluate the features and functionality of the EVB.

2. Hardware Details

This chapter describes the hardware features of the RS9113 n-Link module EVB Evaluation Board.

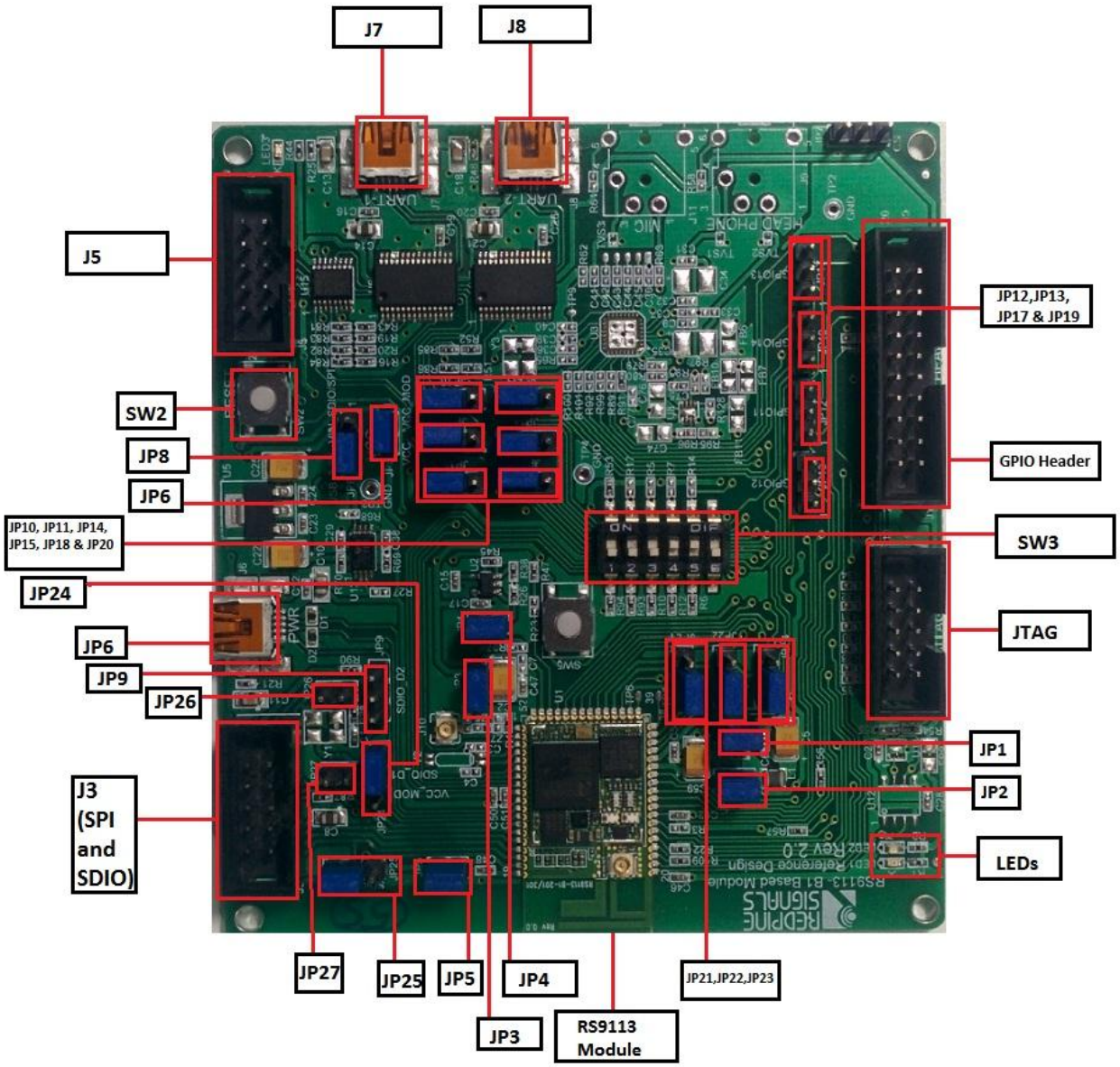

Figure 1: RS9113EVB Reference

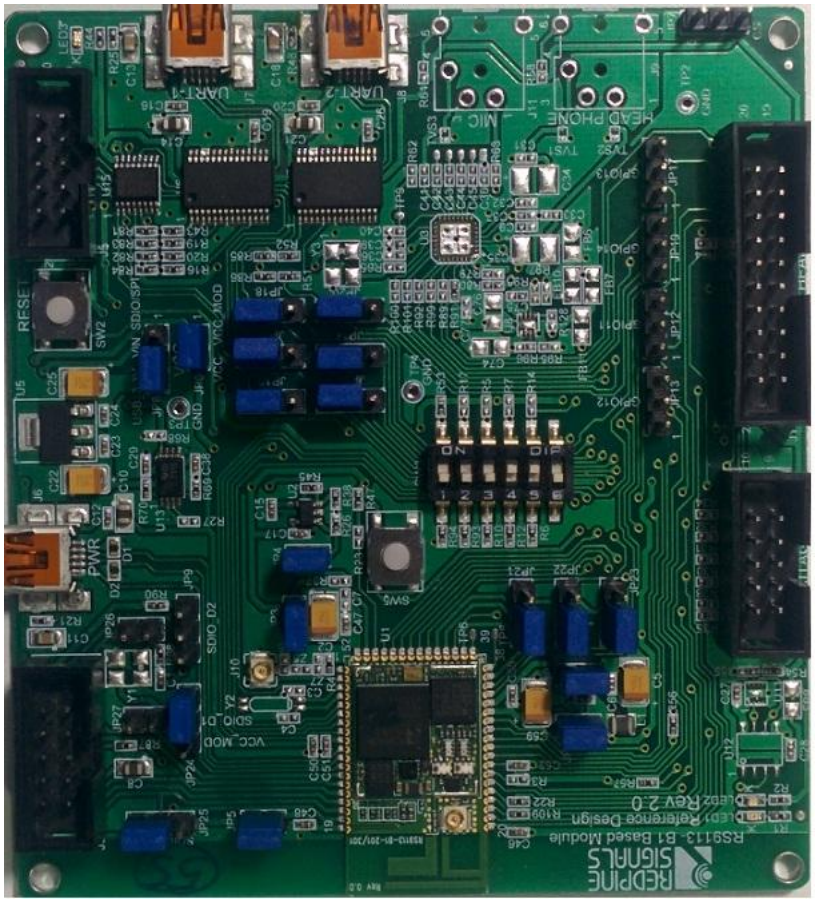

Figure 1: RS9113 EVB in USB mode

Figure 1: RS9113 EVB in SDIO mode

J1(GPIO):
J1 is a 20-pin GPIO header that provides access to GPIO lines of the module. Refer to RS9113WiSeConnect/Connect-io-n modules datasheet for GPIO pin details.

J2(JTAG):

J2 is a 10-pin header for JTAG programming. This header should not be used.

J3(SPI/SDIO):

J3 is a 10 pin header to provide access to SDIO or SPI interface of the wireless module.

J5(UART-1):

J5 is a 10 pin serial UART (3.3V TTL) connector to provide access to UART-1 interface of the wireless module. The ground pin of this header should be connected to a corresponding ground pin of the MCU.

J6:

J6 is an external power source for the EVB through a mini-USB connector. This interface can also be used as a USB host interface. If the Host MCU is not capable of supplying rated EVB current, then EVB can be powered through J6 connector.

J7(UART-1):

J7 is an USB interface to provide easy access to the UART-1 interface of the wireless module. The connector is interfaced to USB-UART bridge that enable host to perform serial communication over USB interface.

J8(UART-2):

J8 is an USB interface to provide easy access to the UART-2 interface of the wireless module. The connector is interfaced to USB-UART bridge that enable host to capture debug log messages from the module. This provision is currently reserved until supported in the firmware.

Power LED:

Power LED is used to indicate state of power supply to the EVB.

LEDs:

Two LEDs namely LED1 and LED2 are used to indicate Wi-Fi or BT state. These are general purpose LEDs connected to GPIO pins of RS9113 module.

(1) LED1 is connected to GPIO_16 of RS9113 module for Wi-Fi activity.

(2) LED2 is connected to GPIO_19 of RS9113 module for BT activity.

JP1:

Jumper JP1 enables power supply to the RF transceiver. This jumper should always be set.

JP2:

Jumper JP2 facilitates measurement of current consumption of VIN_MOD for the wireless module. This jumper should always be set during normal operations.

JP3:

Jumper JP3 facilitates measurement of current consumption of VBAT for the wireless module. This jumper should always be set during normal operations.

JP5:

This jumper should always be set during operations.

JP6:

Jumper JP6 facilitates measurement of current consumption for the wireless module. This jumper should always be set during normal operations.

JP8:

Jumper JP8 facilitates selection for power supply to the module either through USB or from an external host.

(1) For USB supply, set the jumper to the USB 3.3V position on the EVB by shorting pins 2 and 3 on JP8.

(2) For external MCU supply, set the jumper to the VIN SDIO position on the EVB by shorting pins 1 and 2 on JP8.

JP9:

In UART and USB mode, remove jumper on these pins. In SPI mode, there are two possibilities.

1. If the interrupt on host is configured as active-HIGH, short JP9 pins 1 and 2.
2. If the interrupt on host is configured as active-LOW, short JP9 pins 2 and 3.

JP1:

Jumper JP1 enables power supply to the RF transceiver. This jumper should always be set.

JP2:

Jumper JP2 facilitates measurement of current consumption of VIN_MOD for the wireless module. This jumper should always be set during normal operations.

JP3:

Jumper JP3 facilitates measurement of current consumption of VBAT for the wireless module. This jumper should always be set during normal operations.

JP5:

This jumper should always be set during operations.

JP6:

Jumper JP6 facilitates measurement of current consumption for the wireless module. This jumper should always be set during normal operations.

JP8:

Jumper JP8 facilitates selection for power supply to the module either through USB or from an external host.

(3) For USB supply, set the jumper to the USB 3.3V position on the EVB by shorting pins 2 and 3 on JP8.

(4) For external MCU supply, set the jumper to the VIN SDIO position on the EVB by shorting pins 1 and 2 on JP8.

JP9:

In UART and USB mode, remove jumper on these pins. In SPI mode, there are two possibilities.

3. If the interrupt on host is configured as active-HIGH, short JP9 pins 1 and 2.
4. If the interrupt on host is configured as active-LOW, short JP9 pins 2 and 3.

JP19:

1. To use the pin as I2S data output, set jumper on pins 2 and 3.
2. To access the pin in the GPIO_14 header or to use the pin in UART-2 mode set jumper on pins 1 and 2.

JP20:

1. In UART2 mode, set jumper on pins 2 and 3.
2. To use the pin as GPIO_14_Header, set jumper on pins 1 and 2.

JP21, JP22 and JP23:

1. In USB mode, set jumper on pins 1 & 2
2. In other mode, set jumper on pins 2 & 3

JP24:

1. In USB mode, for internal clock set jumper on pins 2 & 3
2. In USB mode, for external clock set jumper on pins 1 & 2
3. Remove the jumper in other modes.

JP25:

1. In USB mode for 12MHz clock, set jumper on pins 1 & 2
2. In USB mode for 24MHz clock, set jumper on pins 2 & 3

3. Remove the jumper in other modes.

JP26 and JP27:

1. In USB mode, set jumper on JP26 & JP27
2. In other modes, no set jumper on JP26 & JP27

SW2:

SW2 is a reset push button to provide reset to the RS9113 module. If RESET is always driven by the host, the push button reset is not needed on this pin in which case, ensure that jumper JP4 is not set.

SW5:

SW5 is a general purpose GPIO push button. The functionality for this button is reserved for now until supported in the firmware.

SW3:

This is a DIP type switch used to configure EVB Host interface mode. The following tables described SW3 switch selection logic for configuring EVB in different Host interface modes.

a) USB mode:

Switch number	Configuration
1	OFF/ON
2	OFF
3	OFF
4	ON
5	ON
6	OFF

Table 1: USB Host Interface Selection

a) SDIO mode:

Switch number	Configuration
1	OFF/ON
2	OFF
3	OFF
4	OFF
5	OFF
6	OFF

Table 2: SDIO Host Interface Selection

2.1 EVB interface pin description

The following tables describe interface pin details.

2.1.1 SPI header pin description

The following table describes the pins of SPI header. The same header is shared with SDIO interface.

Pin Number	Pin Name	Direction	Description
1	NC	-	This pin must be left open.
2	SPI_CS	Input	SPI slave select from host(active low)
3	GND	-	Ground
4	VDD	-	Supply voltage.
5	SPI_CLK	Input	Serial clock in from the host. The clock can be up to 80 MHz
6	GND	-	Ground
7	SPI_MOSI	Input	SPI data input
8	SPI_MISO	Output	SPI data output
9	SPI_INTR	Output	Active high, level triggered interrupt, used in SPI mode. The interrupt is raised by the EVB to indicate there is data to be read by the Host
10	RESET	Input	Reset to RS9113 module.

Table 3: SPI Header Pins

2.1.2 UART1 header pin description

Pin number	Pin name	Direction	Description
1	VCC	-	Supply voltage.
2	VCC	-	Supply voltage.
3	VCC	-	Supply voltage.
4	UART-RX1	Input	UART Receive pin of the EVB
5	UART-TX1	Output	UART Transmit pin of the EVB
6	UART-CTS1	Input	Should be connected in case of hardware flow control. If not used, leave it open.
7	UART-RTS1	Output	Should be connected in case of hardware flow control. If not used, leave it open.
8	GND	-	Ground
9	GND	-	Ground
10	GND	-	Ground

Table 4: UART Header

2.1.3 GPIO header pin description

This header interface is reserved until supported in the firmware

Pin number	Pin name	Direction	Description
1	GND	-	Ground
2	VCC	-	Supply voltage
3	GPIO_21	Input	Reserved
4	AUX_ADC_IN0	Input	Reserved
5	GPIO_9_Header	Input/Output	Reserved
6	GPIO_10_Header	Input/Output	Reserved
7	GPIO_15	Input/Output	Reserved
8	GPIO_18_Header	Input/Output	Reserved
9	GPIO_17_Header	Input/Output	Reserved
10	GPIO_14_Header	Input/Output	Reserved
11	GPIO_13_Header	Input/Output	Reserved
12	NC	-	This pin must be left open.
13	ULP_GPIO_10	Input/Output	Reserved
14	GPIO_19/LED1/BT_ACTIVE	Input/Output	Reserved
15	GPIO_11_Header	Input/Output	Reserved
16	GPIO_2	Input/Output	Reserved
17	GPIO_12_Header	Input/Output	Reserved
18	NC	-	This pin must be left open.
19	GPIO_8/I2C-SDA	Input/Output	Reserved
20	GPIO_7/I2C-SCL	Input/Output	Reserved

Table 5: GPIO Header

2.2 Header Pin Orientation

The figure below describes the orientation of headers for reference.

SPI/SDIO Header - J3

UART Header - J5

GPIO Header - J1

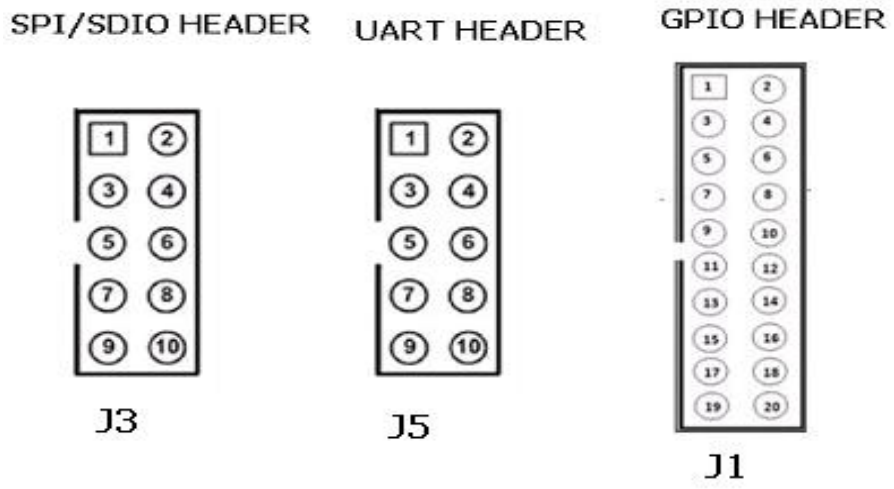

Figure 1: Header Pin Orientation

3. Evaluation of the n-Link EVB on different modes

1. WiFi Alone mode(WiFi AP, WiFi Station and WiFi Direct)
2. WiFi Station + BT Classic Co-ex mode
3. WiFi Station + BLE Co-ex mode
4. WiFi Station + Zigbee Co-ex mode

3.1 WiFi Alone mode(WiFi AP, WiFi Station and WiFi Direct)

Follow the document "RS9113-n-Link-Module-Driver-Installation-Guide-V3.0.pdf" section "6 OneBox-Mobile™ in WiFi only mode" to evaluate the WiFi alone functionality of the n-Link EVB.

3.2 WiFi Station + BT Classic Co-ex mode

Follow the document "RS9113-n-Link-Module-Driver-Installation-Guide-V3.0.pdf" section "7 OneBox-Mobile™ Coexistence Driver in WiFi + BT Classic mode" to evaluate the WiFi + BT Classic functionality of the n-Link EVB.

NOTE: Follow the section "8 Installation and usage of Bluetooth manager" in the same document to install the Bluetooth manager on target platform on which EVB is connected.

3.3 WiFI Station + BLE Co-ex mode

Follow the document "RS9113-n-Link-Module-Driver-Installation-Guide-V3.0" section "9 OneBox-Mobile™ Coexistence Driver in WiFi +BLE mode" to evaluate the WiFi + BLE functionality using the n-Link EVB.

3.4 WiFi Station + Zigbee Co-ex mode

Follow the document "RS9113-n-Link-Module-Driver-Installation-Guide-V3.0" section "10 OneBox-Mobile™ Coexistence Driver in WiFi+Zigbee Mode" to evaluate the WiFi + Zigbee functionality using the n-Link EVB.