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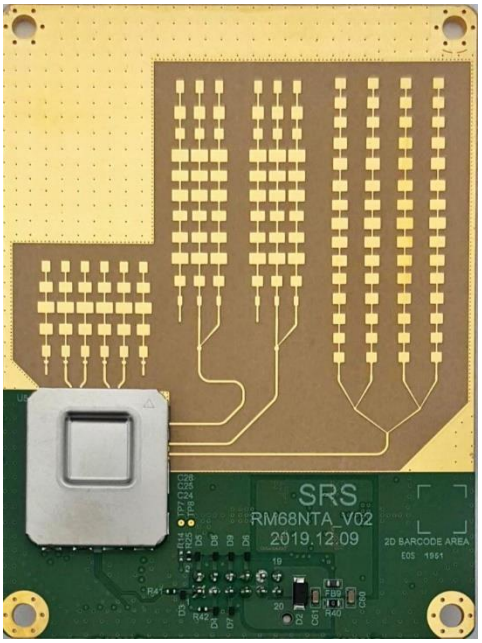
User Manual
Radar Module (RM68-NTA)



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0.1		RM68-NTA User Manual

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Rev. 0.2		

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1. Overview and Package Contents

1.1 Introduction

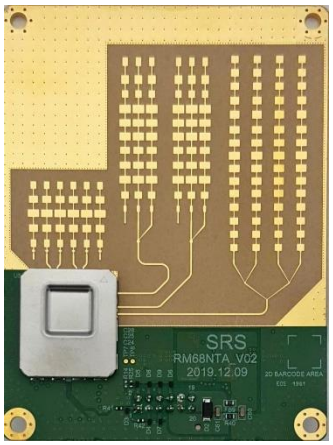
The RM68-NTA Module from Smart Radar System(SRS) is an easy-to-use evaluation board for the IWR6843 mmWave sensing device. The RM68-NTA Module contains everything required to start developing software for on-chip C67x DSP core and low-power ARM R4F controllers, including onboard emulation for programming and debugging as well as onboard LEDs for quick integration of a simple user interface.

1.2 Features

- 12-pin connectors interface connector
- FTDI with a serial port for onboard QSPI flash programming
- Back-channel UART through USB-to-PC for logging purposes
- On-board antenna
- A LEDs for basic user interface
- 5-V power to power the board

1.3 Package Contents

Table 1. List of Package

Number	Name & Description	Picture
RM68-NTA	Radar Module	
RM68_DBG	Radar Module Debugger board	

2. Hardware Description

2.1 Board image

2.1.1 Radar module (RM68-NTA)

Figure 1 and Figure 2 show top and bottom view of the RM68-NTA, respectively.

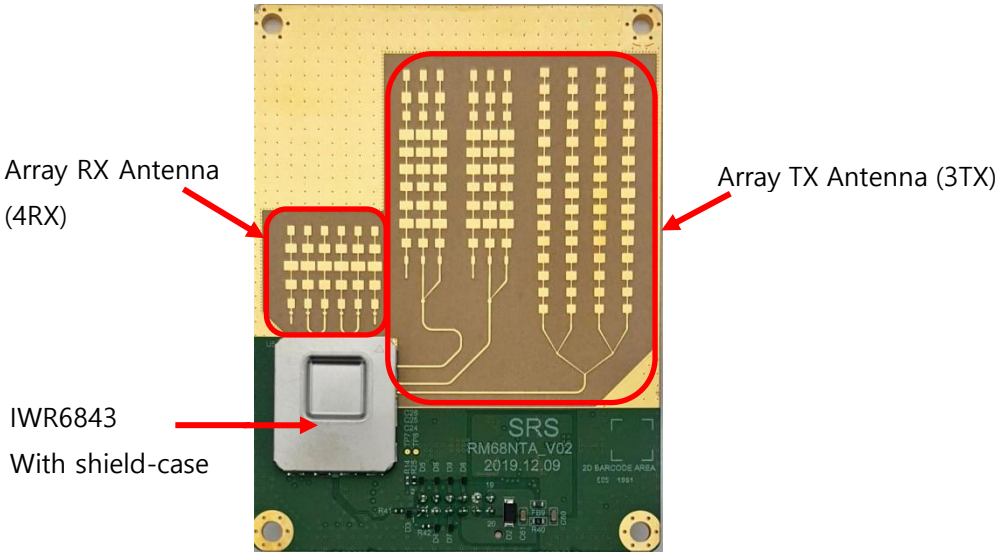


Figure 1. RM68-NTA (Top)

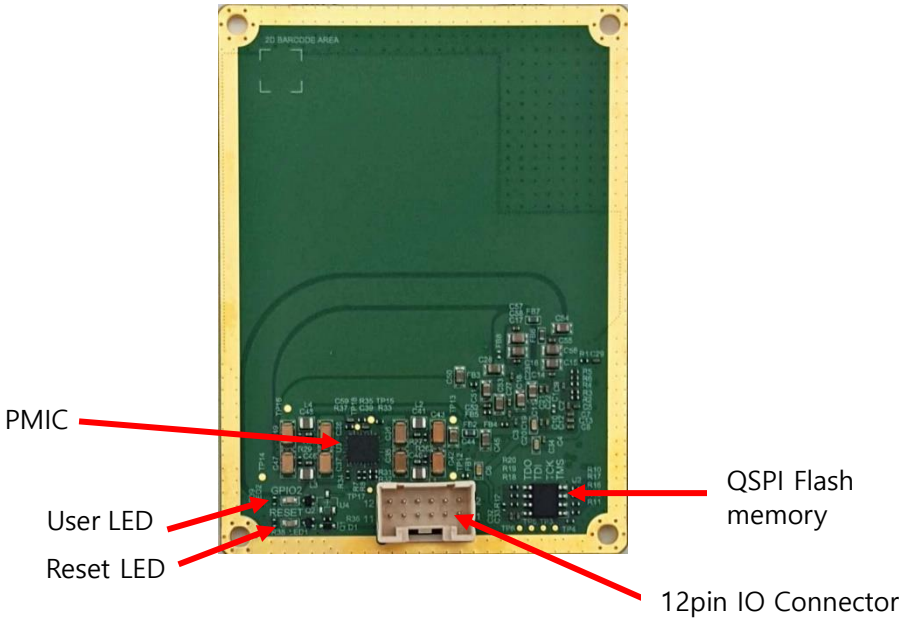


Figure 2. RM68-NTA (Bottom)

2.1.2 Radar module Debugger Board (RM68_DBG)

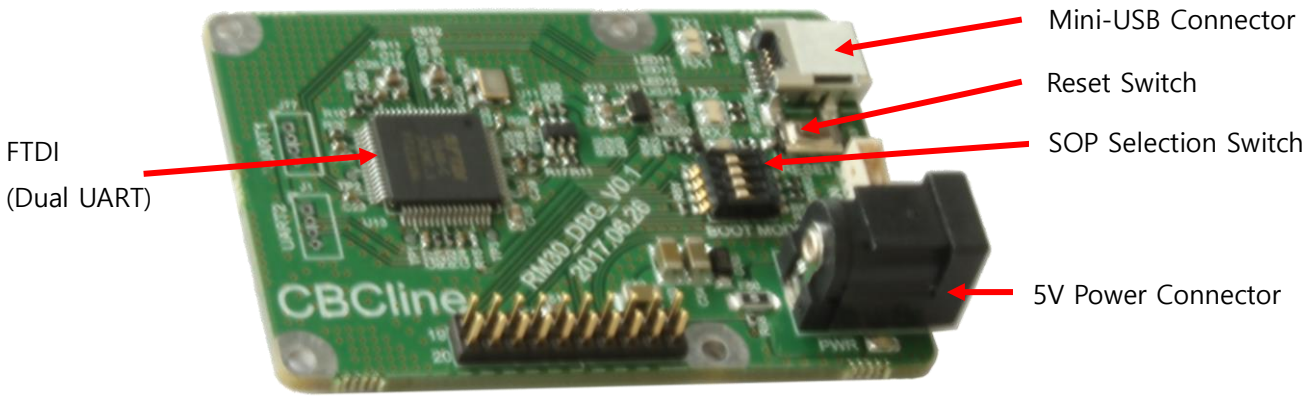


Figure 3. RM68 Debugger Board (Top)

2.2 Connectors

2.2.1 12-pin Connector

Connector - P/N : B12B-PUDSS-1(LF) (JST)

Table 2 12-Pin IO Connector Pin

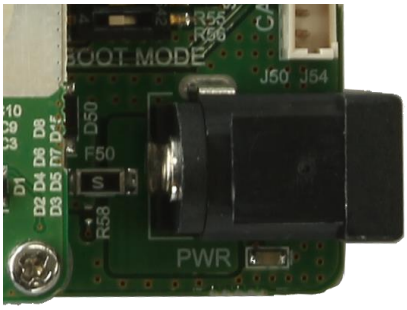
Description	IN/OUT	Name	Num	Num	Name	IN/OUT	Description
Internal pulldown (1kohm).	Input	SOP2	2	1	UART2_TX	Output	For MSS logger.
For flashing and send the config data	Output	UART1_TX	4	3	UART2_RX	Input	Not used
	Input	UART1_RX	6	5	AR_RESET_N	Input	Low Reset. Internal pullup (10kohm)
High Enable. Internal pulldown (100kohm)	Input	PWR_EN	8	7	GND		
		GND	10	9	GND		
5V/2A	Input	VDD_5V0	12	11	VDD_5V0	Input	5V/2A

2.2.2 Power Connector

The RM68-NTA is powered by the 5-V power jack (4-A current limit), shown in Figure 7. As soon as the power is provided, the RESET, PWR_OK and PWR LEDs should glow, indicating that the board is powered on.

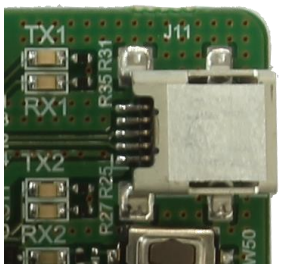
NOTE1: A 5-V, > 2.5-A supply brick with a 2.1-mm barrel jack (center positive) is not included. SRS recommends using an external power supply that complies with applicable regional safety standards, such as UL, CSA, VDE, CCC, PSE, and more. The length of the power cable should be < 3 m.

NOTE2: After the 5-V power supply is provided to the RM68 debugger Board, it is recommended to press the RESET switch (SW50) one time to ensure a reliable boot-up state.



2.2.3 Mini-USB Connector

The connectivity is provided through the mini USB connector over the onboard FT2232H(FTDI).
The FT2232H is a USB 2.0 High Speed to Dual UART IC.



2.3 Switches and LEDs

2.3.1 Sense-on-Power (SOP) Switch

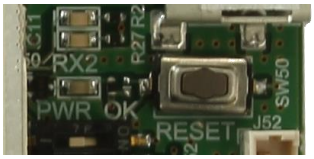
The IWR6843 device can be set to operate in three different modes based on the state of the SOP lines. These lines are sensed only during boot up of the IWR device. The state of the device is detailed by Table 3.

Table 3 SOP Switch for Boot mode

SW NUM	SOP	MODE		
		FUNCTION	Flashing	Debug
3	SOP 2	OFF	ON	OFF

2.3.2 Reset Switch

Used to RESET the IWR6843 device.



2.3.3 LEDs

Table 4 provides the switch and LED information.

Table 4 LEDs Information

Ref Num.	Usage	Comments
LED1	GPIO2 (USER LED)	Glows when the GPIO2 is logic-1
LED2	RESET LED	This LED is used to indicate the state of RESET pin. If this LED is glowing, the device is out of reset. This LED will glow only after the 5-V supply is provided.

3. Specifications

Absolute Maximum Ratings

			Min	Max	Unit
VDD_5V0	Supply voltage input		-0.3	6	V
VIH	Voltage Input High	UART1_RX, UART2_RX	2.25		V
VIL	Voltage Input Low			0.62	V
VIH	Voltage Input High	RESET_N, SOP2	1.57		V
VIL	Voltage Input Low			0.3	V
VOH	High-level output threshold (IOH = 6 mA)	UART1_TX, UART2_TX,	2.85		V
VOL	Low-level output threshold (IOL = 6 mA)			0.45	V

Recommended Operating Conditions

			Min	Max	Unit
VDD_5V0	Supply voltage input		4.75	5.25	V
	Supply Current input		2		A
VIH	Voltage Input High	UART1_RX, UART2_RX	2.25		V
VIL	Voltage Input Low			0.62	V
VIH	Voltage Input High	RESET_N, SOP2	1.57		V
VIL	Voltage Input Low			0.1	V
VOH	High-level output threshold (IOH = 6 mA)	UART1_TX, UART2_TX	2.85		V
VOL	Low-level output threshold (IOL = 6 mA)			0.3	V

4. Software Setup

4.1 Configure Your PC

This connection provides the following interfaces to the PC:

- UART1 for flashing the onboard serial flash, downloading FW through Radar Studio, and getting application data sent through the UART.(ex, COM5)
- MSS logger UART2 (can be used to get MSS code logs on the PC).(ex, COM6)

When the USB is connected to the PC, the device manager should recognize the following COM ports.

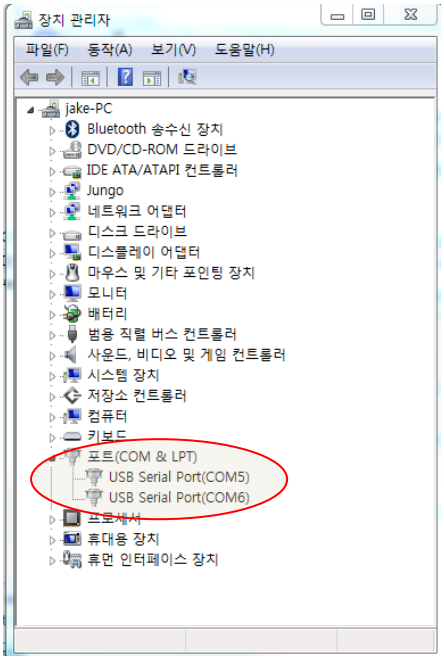


Figure 4. Device manager on the PC

4.2 Software, Development Tools, and Example Code

To enable quick development of end applications on the C67x DSP and R4F core in the IWR6843, TI provides a software development kit (SDK) that includes demo codes, software drivers, emulation packages for debug, and more. These can be found at *mmwave-sdk*.

5. Mechanical Mounting of PCB

* Uint : mm

L x W x H : 60 x 80 x 9.6

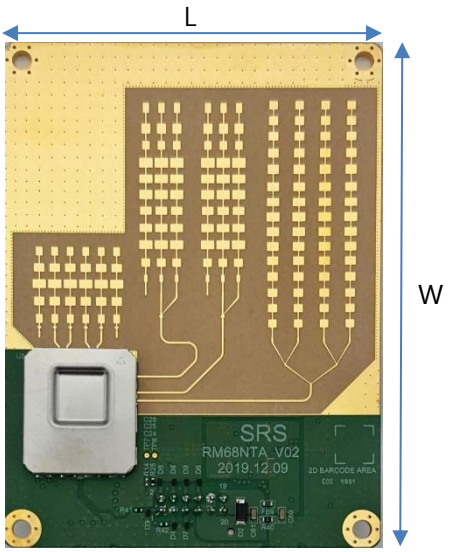


Figure 5. Mechanical Size

6. PCB Storage and Handling Recommendations

The immersion silver finish of the PCB provides a better high-frequency performance, but is also prone to oxidation in open environments. This oxidation causes the surface around the antenna region to blacken.
To avoid oxidation, the PCB should be stored in an ESD cover and kept at a controlled room temperature with low humidity conditions. All ESD precautions must be taken while using and handling the RM68-NTA.

7. Troubleshooting

8. Notice for FCC

FCC Approval

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device should be installed and operated with minimum 20Cm between the radiator and your body.

OEM Responsibilities to comply with FCC

-The module is limited to OEM installation only.

-The OEM integrator is responsible for ensuring that the end-user has no manual instructions to remove or install module.

-The module is limited to installation in fixed applications.

-The transmitter module must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

-The OEM integrator will be responsible to satisfy SAR/ RF Exposure requirements, when the module integrated into the host device.

-The OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).Also, the OEM integrator is responsible to provide to the host manufacturer for compliance with the Part 15B requirements.

Host Product Manual

-The host manual shall include the following regulatory statement:

-Part 15.19: This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

-Part 15.21: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

-This device should be installed and operated with minimum 20Cm between the radiator and your body.

Host Product labeling

The module is labeled with its own FCC. If the FCC ID is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. In that case, the final end product must be labeled in a visible area with the following: “Contains FCC ID: **2AVKZRM68-NTA**”