HARDWARE

REFERENCE DESIGN

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UM621 Series

Multi-GNSS Dual-frequency Integrated Positioning Module

Revision History

Version	Revision History	Date
R1.0	First release	Oct. 2022
R1.1	Optimize the description of antenna power supply; Add Chapter 3 Power Supply Requirements	Apr. 2023
R2.0	Expand the document scope: applicable to UM621 series	Sept. 2023
R2.1	Modify the voltage range of V_BCKP; Add the voltage requirements of VCC and V_BCKP for the module that supports wake-on-motion	Feb. 2024

Information, such as product specifications, descriptions, features and user guide in this manual, are subject to change by Unicore at any time without prior notice, which may not be completely consistent with such information of the specific product you purchase.

Should you purchase our product and encounter any inconsistency, please contact us or our local authorized distributor for the most up-to-date version of this manual along with any addenda or corrigenda.

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1 Reference Circuit Using an Active Antenna

- The voltage range of VCC and V_BCKP are described in Chapter 3: Power Supply Requirements
- Ground all GND pins of the module
- Connect the RF_IN signal to the antenna and note the 50 Ω impedance matching
- Feed the antenna with an external power supply

  If the antenna power supply and the module's main supply VCC use the same power rail, the ESD, surge and overvoltage from the antenna will have an effect on VCC, which may cause damage to the module. Therefore, it's recommended to design an independent power rail for the antenna to reduce the possibility of damage to the module.

- Requirements for the odometer speed pulse: width ≥ 100 μs, frequency ≤ 5K Hz

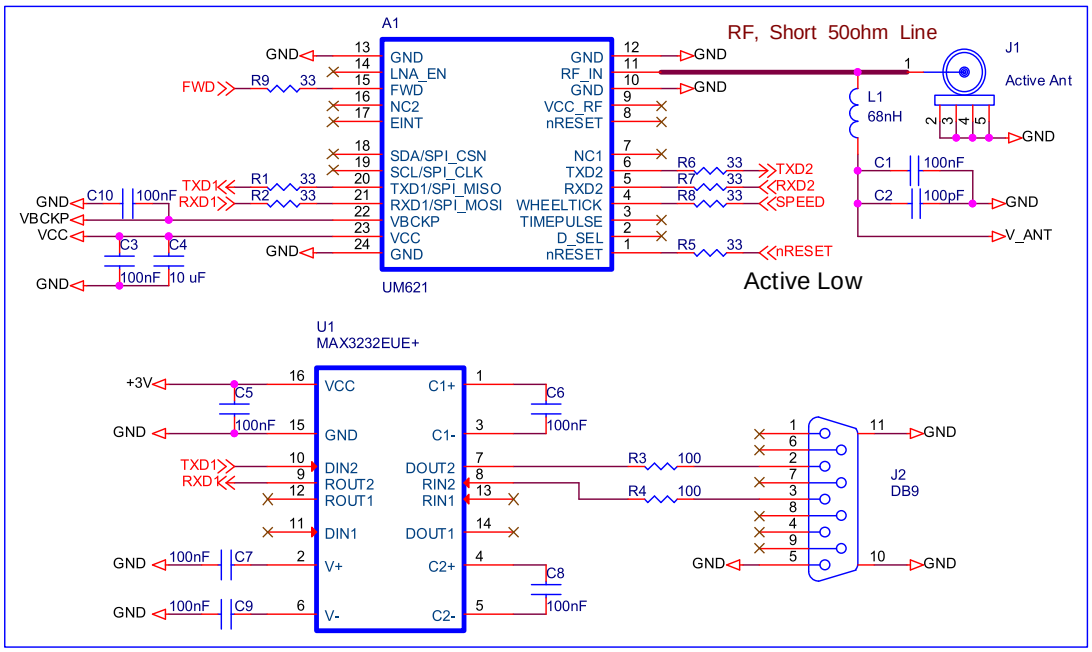

Figure 1-1 Reference Circuit Using an Active Antenna

2 Reference Circuit Using a Passive Antenna

- When using a passive antenna, a low noise amplifier should be added between the antenna and the RF_IN of the module in order to ensure the performance of the system.
- For the RF routing (antenna → LNA → RF_IN), note the 50 Ω impedance matching
- For the voltage range of V_BCKP, see Chapter 3: Power Supply Requirements
- Requirements for the odometer speed pulse: width ≥ 100 μs, frequency ≤ 5 KHz

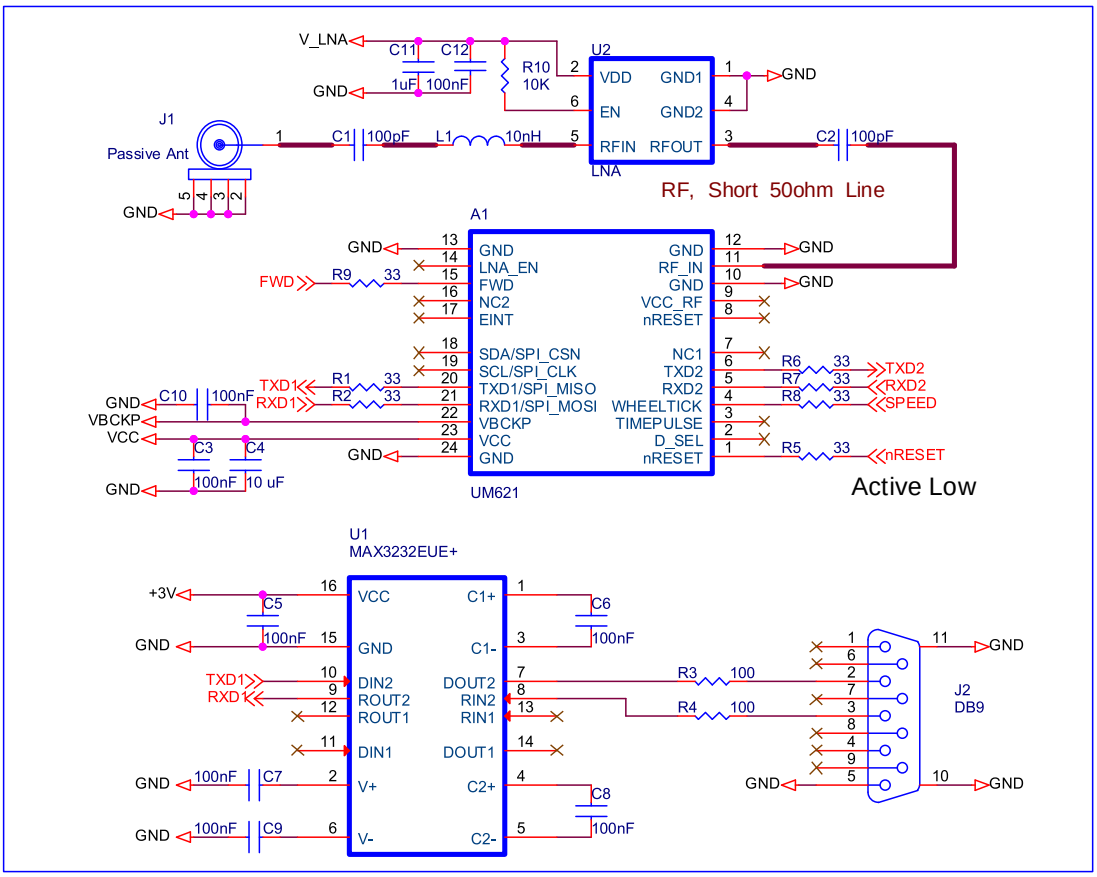

Figure 2-1 Reference Circuit Using a Passive Antenna

3 Power Supply Requirements

3.1 Main Supply (VCC)

- For the module that does not support wake-on-motion, the voltage range of VCC is 2.7 V ~ 3.6 V.
- For the module that supports wake-on-motion, the voltage range of VCC is 3.0 V ~ 3.6 V.

Notes:

- The VCC initial level when power-on should be less than 0.4 V.
- The VCC ramp when power-on should be monotonic, without plateaus.
- The voltages of undershoot and ringing should be within 5% VCC.
- VCC power-on waveform: The time interval from 10% rising to 90% must be within 100 μs ~ 10 ms.
- Power-on time interval: The time interval between the power-off (VCC < 0.4 V) to the next power-on is recommended to be larger than 500 ms.

3.2 Backup Supply (V_BCKP)

When using hot start, users should supply backup power to the module.

- For the module that does not support wake-on-motion, the voltage range of V_BCKP is 2.0 V ~ 3.6 V.
- For the module that supports wake-on-motion, the voltage range of V_BCKP is 3.0V ~ 3.6 V. Meanwhile, ensure that the voltage at V_BCKP is lower than that at VCC.

Notes:

- The V_BCKP initial level when power-on should be less than 0.4 V.
- The V_BCKP ramp when power-on should be monotonic, without plateaus.
- The voltages of undershoot and ringing should be within 5% V_BCKP.
- V_BCKP power-on waveform: The time interval from 10% rising to 90% must be within 100 μs ~ 10 ms.
- Power-on time interval: The time interval between the power-off (V_BCKP < 0.4 V) to the next power-on is recommended to be larger than 500 ms.
- The V_BCKP pin cannot be floating or connected to ground. When V_BCKP is not used, it should be connected to VCC or connected to backup power.

4 Recommended BOM

	Component	Order No.	Manufacturer
U1	RS-232 Transceivers	MAX3232EUE+	TI
U2	LNA	MXDLN14TP	MAXSCEND

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