HARDWARE

REFERENCE DESIGN

WWW.UNICORE.COM

UM680A

Automotive Grade GNSS High Precision RTK Positioning Module

Revision History

Version	Revision History	Date
R1.0	First release	Oct. 2024

Legal Right Notice

This manual provides information and details on the products of Unicore Communication, Inc. (“Unicore") referred to herein.

All rights, title and interest to this document and the information such as data, designs, layouts contained in this manual are fully reserved, including but not limited to the copyrights, patents, trademarks and other proprietary rights as relevant governing laws may grant, and such rights may evolve and be approved, registered or granted from the whole information aforesaid or any part(s) of it or any combination of those parts.

Unicore holds the trademarks of “和芯星通”, “Unicore”, “UNICORECOMM” and other trade name, trademark, icon, logo, brand name and/or service mark of Unicore products or their product serial referred to in this manual (collectively “Unicore Trademarks").

This manual or any part of it, shall not be deemed as, either expressly, implied, by estoppel or any other form, the granting or transferring of Unicore rights and/or interests (including but not limited to the aforementioned trademark rights), in whole or in part.

Disclaimer

The information contained in this manual is provided “as is" and is believed to be true and correct at the time of its publication or revision. This manual does not represent, and in any case, shall not be construed as a commitments or warranty on the part of Unicore with respect to the fitness for a particular purpose/use, the accuracy, reliability and correctness of the information contained herein.

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.

Foreword

This document describes the hardware reference design of Unicore UM680A module.

Target Readers

This document applies to technicians who are familiar with GNSS receivers.

Contents

1 Block Diagram

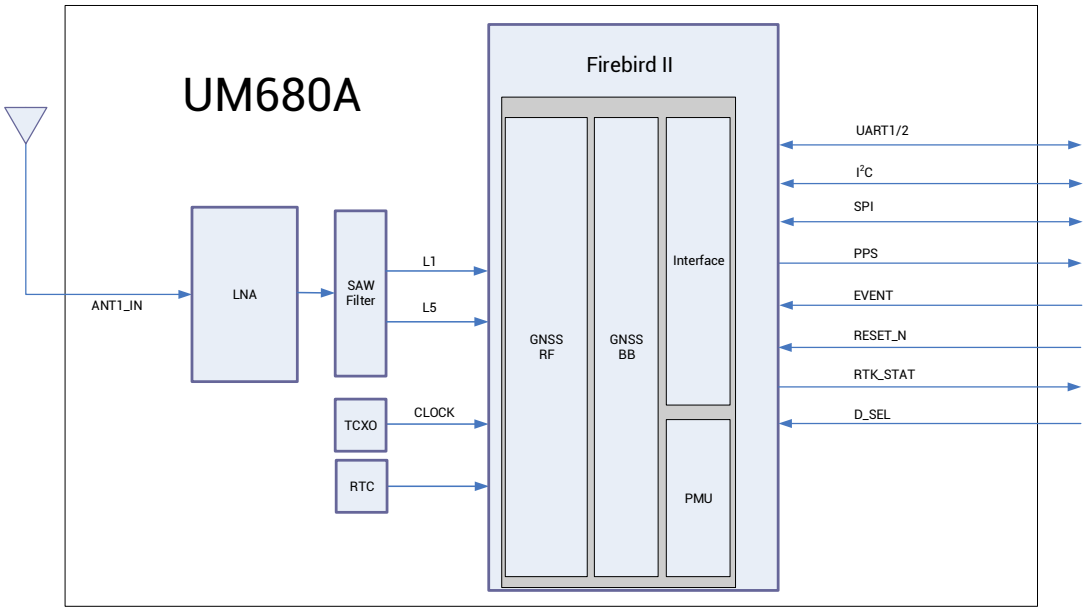


Figure 1-1 UM680A Block Diagram[1]

[1] SPI and I²C are reserved interfaces.

2 UM680A Peripheral Design

- Connect the ANT_IN signal to the antenna, and note the 50 Ω impedance matching.
- Connect all the GND pins to the ground.
- Leave the IO pin open if not used.
- Recommended to add TVS anti-surge protection at the input of the module. Add ESD protection at all the used pins.

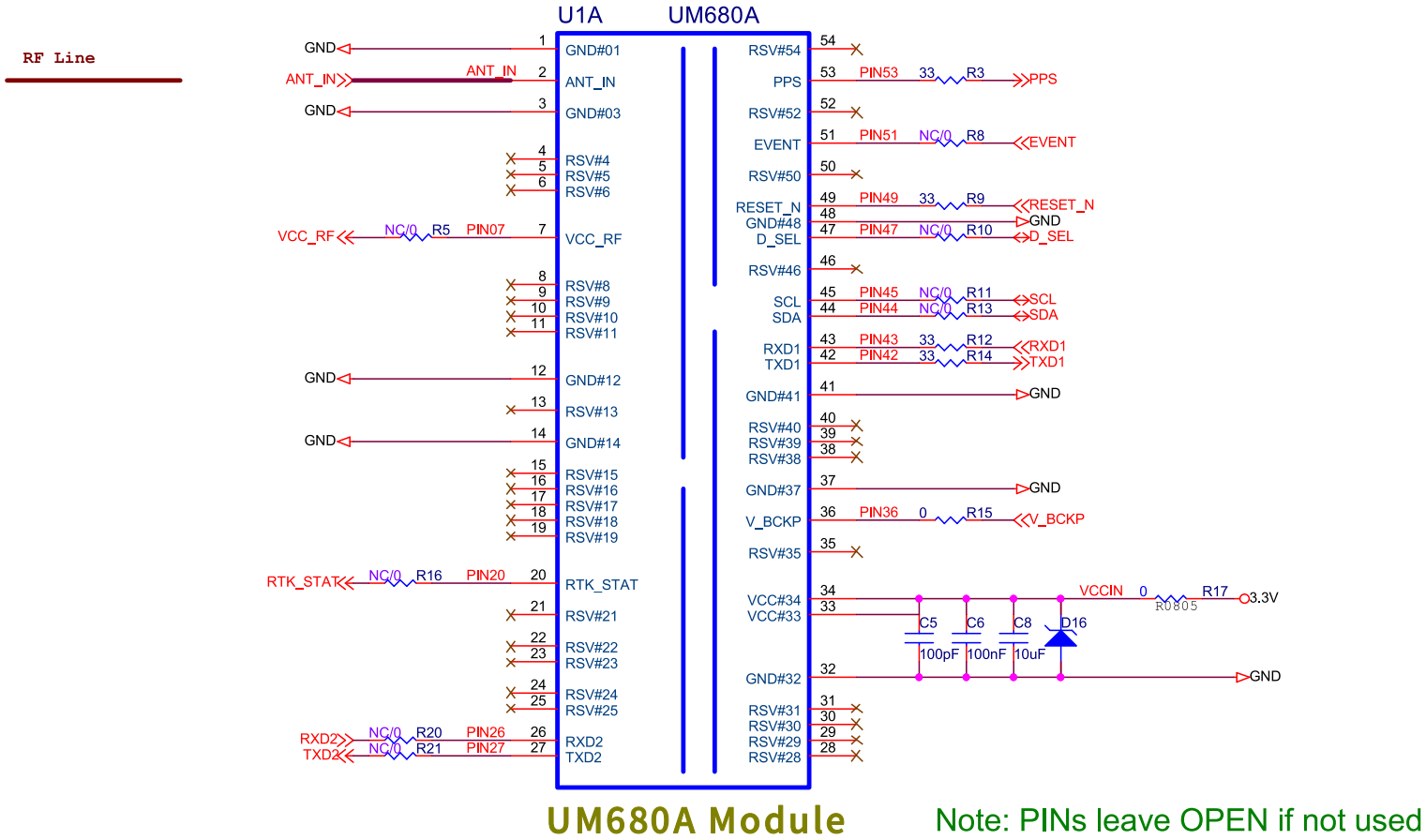


Figure 2-1 UM680A Peripheral Design

The GND pads at the bottom of the module should be grounded to ensure heat dissipation.

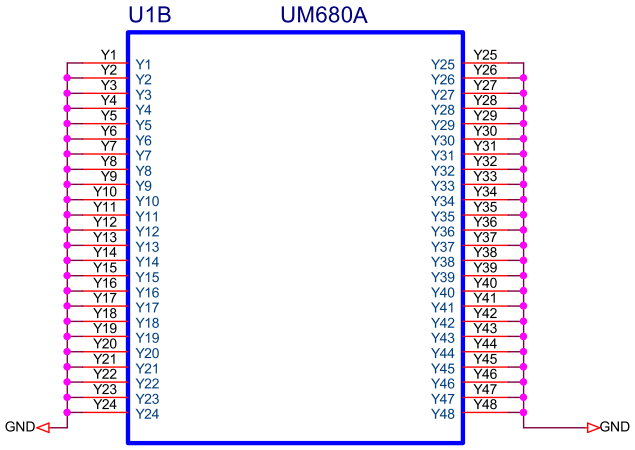


Figure 2-2 UM680A GND Pads

2.1 Main Power VCC

The working voltage range of the module UM680A is 2.7 V to 3.6 V.

Note:

- 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 to 10 ms.
- Power-on time interval: The time interval between the power-off (VCC < 0.4 V) to the next power-on must be larger than 500 ms.

2.2 Backup Power V_BCKP

When using the hot start function of the module UM680A, you need to provide backup power for the module. The input range of V_BCKP is 2.0 V to 3.6 V.

Note:

- 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 to 10 ms.
- Power-on time interval: The time interval between the power-off (V_BCKP < 0.4 V) to the next power-on must be larger than 500 ms.
- When you do not use the hot start function, connect V_BCKP to VCC or a standalone power source. Do not connect it to ground or leave it floating.

2.3 Active Antenna Feed Circuit

The antenna feed circuit consists of the anti-surge design, filter inductors, and ESD protection. The ESD protection diode should support high-frequency signals (above 2000 MHz).

☞ It is not recommended to use VCC_RF to feed the antenna, as it has not been optimized for the anti-lightning strike and anti-surge due to the compact size of the module.

☞ If the antenna feed supply ANT_BIAS 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 is recommended to design an independent power rail for the ANT_BIAS to reduce the possibility of module damage.

Connect the ANT_IN signal to the antenna, and note the 50 Ω impedance matching.

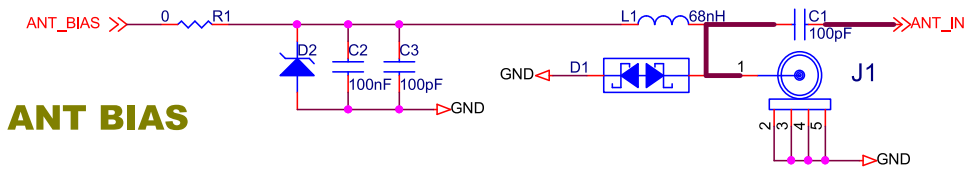
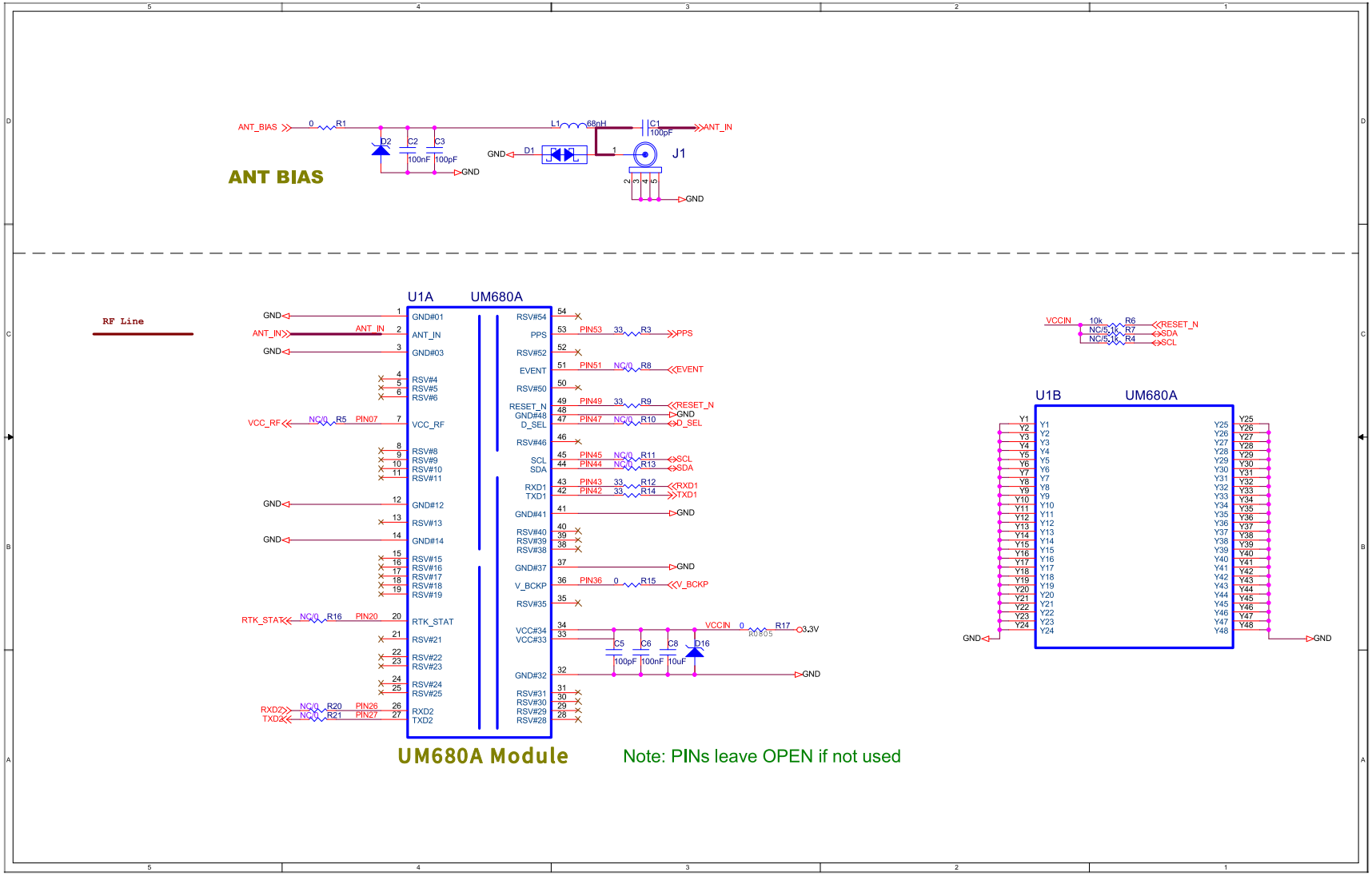


Figure 2-3 Antenna Feed Circuit

2.4 Reset Circuit

UM680A supports system reset. The pin RESET_N is active low and the active time should be no less than 5 ms.

3 Appendix: Schematics of Reference Design


ANT BIAS
ANT_BIAS
R1
L1
68nH
C1
100pF
ANT_IN
D2
C2
C3
100nF
100pF
GND
D1
J1
RF Line
U1A
UM680A
GND#01
ANT_IN
GND#03
RSV#4
RSV#5
RSV#6
VCC_RF
RSV#8
RSV#9
RSV#10
RSV#11
GND#12
RSV#13
GND#14
RSV#15
RSV#16
RSV#17
RSV#18
RSV#19
RTK_STAT
RSV#21
RSV#22
RSV#23
RSV#24
RSV#25
RXD2
TXD2
RSV#54
PPS
RSV#52
EVENT
RSV#50
RESET_N
D_SEL
RSV#46
SCL
SDA
RXD1
TXD1
GND#41
RSV#40
RSV#39
RSV#38
GND#37
V_BCKP
RSV#35
VCC#34
VCC#33
GND#32
RSV#31
RSV#30
RSV#29
RSV#28
VCCIN
3.3V
U1B
UM680A
UM680A Module
Note: PINs leave OPEN if not used

和芯星通科技（北京）有限公司

Unicore Communications, Inc.

北京市海淀区丰贤东路 7 号北斗星通大厦三层
F3, No.7, Fengxian East Road, Haidian, Beijing, P.R.China,
100094
www.unicore.com

Phone: 86-10-69939800

Fax: 86-10-69939888

info@unicorecomm.com