INSTALLATION AND OPERATION

USER MANUAL

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UM482

GPS/BDS/GLONASS/Galileo All-constellation Multi-frequency High Precision Positioning and Heading Module

Revision History

Version	Revision History	Date
Ver. 1.0	First release	Aug. 2017
R3.1	Revise the description of RST_N configuration and the action execution time Add the related description to clarify the VCC restrictions	2019-08-26
R3.2	Chapter 2.1: delete the legacy parameter and add pin mechanical spec Chapter 2.2: add the working current info of No.17 pin	2019-10-14
R3.3	1.2 Technical Specifications: update the weight value from 8.8 to 9.2 1 Overview: update the product diagram	2020-02-26
R3.4	1.2 Technical Specifications: add QZSS	2020-07-01
R3.5	Update BDS frequencies in section 1.2	2020-10-21
R3.6	Add external antenna feed reference design	2020-12-17
R4	Remove information on the MEMS device and add RF input power consumption of the antenna	2021-04-13
R4.1	Modify pin definition in Figure 2-2	2021-06-30
R4.2	Update Figure 3-4 and fix typo	2021-07-06

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Foreword

This <User Manual> offers you information on the features of the hardware, the installation, specifications and use of the UNICORECOMM UM482 product.

For the generic version of this manual, please refer to the appropriate part of this manual depending on your purchased product configuration - concerning CORS, RTK and Heading.

Readers it applies to

This <User Manual> is written for technologists who have knowledge of GNSS Receivers to some extent – it is not for general readers.

Contents

1 Overview

UM482 is the smallest, all-constellation, multi-frequency, high precision RTK and heading module developed by Unicore Communications Inc. The module is targeted for use in robots, UAVs and intelligent driving applications.

The UM482 provides reliable centimeter-level accuracy and a high accuracy heading output at high update rates.

By employing a single UC4C0 (432 channel tracking) baseband chip with internal RF front-end in a single-sided SMD package, UM482 can achieve very small size (30x40 mm). It can simultaneously track GPS L1/L2 + BDS B1I/B2I + GLONASS L1/L2+Galileo E1/E5b+QZSS.

The UM482 adopts UNICORECOMM's new-generation "UGypsophila" RTK processing technology and takes advantage of high-performance data sharing capability and the extremely simplified operating system within the NebulasII GNSS SoC chip. It uses optimized multi-dimensional RTK matrix pipeline computation, resulting in much higher RTK processing capability.

Figure 1-1 UM482 Module

1.1 Key Features

- 30×40 mm, small footprint multi-frequency RTK and heading module, SMD package
- Supports GPS L1/L2+BDS B1I/B2I +GLONASS L1/ L2+Galileo E1/E5b and QZSS L1/L2
- Precise RTK positioning and heading
- RTK Initialization time < 5s
- Dual antenna input with supporting antenna signal detection
- 20Hz data output rate
- Adaptive recognition of RTCM input data format

- May also support odometer input and external high-performance IMU interface*

1.2 Technical Specifications

Table 1-1 Performance Specifications

Channels	432 channels, based on NebulasII SoC chip	Cold Start	＜25s
Frequency	GPS L1/L2 BDS B1I/B2I[1] GLONASS L1/L2 Galileo E1/E5b QZSS L1/L2	RTK Initialization Time	＜5s (typical)
Single Point Positioning (RMS)	Horizontal: 1.5m Vertical: 2.5m	Initialization Reliability	＞99.9%
DGPS (RMS)	Horizontal: 0.4m Vertical: 0.8m	Differential Data	RTCM 3.0/3.2/3.3
		Data Formats	NMEA-0183，Unicore Binary
RTK (RMS)	Horizontal: 1cm+1ppm Vertical: 1.5cm+1ppm	Update Rate	20Hz
		Time accuracy (RMS)	20ns
Heading Accuracy (RMS)	0.2 degree/1m baseline	Data Accuracy (RMS)	0.03m/s
Size	30×40×4 mm	Power Consumption	2.4W (Typical)
Weight	9.2g		

Table 1-2 Functional Ports

3x UART, 1xI2C, 1x SPI (LV-TTL)	1x1PPS (LV-TTL)
1x Event input	

[1] BDS B1I/B3I is supported with the firmware upgraded

1.3 Interfaces

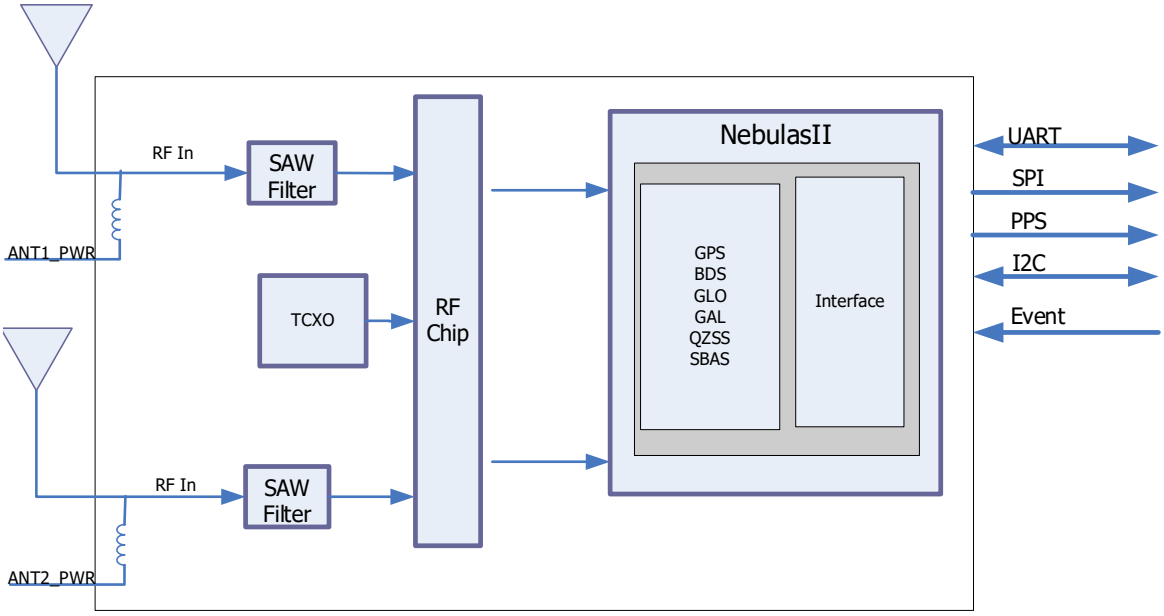

Figure 1-2 Block Diagram

- **RF Part**

GNSS signals received from the antenna via a coaxial cable are filtered and enhanced. The RF part converts the RF input signals into the IF signal, and then IF analog signals are converted into the digital signals required for NebulasII digital processing.

- **NebulasII SoC (UC4C0)**

The UM482 incorporates the processing from the NebulasII (UC4C0), UNICORECOMM's new generation high precision GNSS SoC using 55nm low power design. It supports up to 12 digital intermediate frequencies or 8 analog intermediate frequency signals, and can track 12 navigation signals with 432 channels.

- **1PPS**

UM482 outputs a 1 Pulse-per-second time strobe with a corresponding time and positioning tag. The pulse width/polarity is configurable.

- **Event**

UM482 provides a 1 Event Mark Input with adjustable pulse width and polarity.

- **Reset (RST_N)/Factory Default (FRESET_N)**

The reset signal RST_N should be set active low for no less than 20ms effective time.

When the FRESET_N is activated, the user parameters in NVM will be cleared and the module is restored to factory default settings. The FRESET_N is active low. Please pull FRESET_N pin to low for more than 5s to ensure a successful reset.

2 Hardware

2.1 Dimensions

Table 2-1 Dimensions

Symbol	Value (mm)	Tolerance (mm)
A	40.00	-0.2 +0.5
B	30.00	±0.2
C	4.00	±0.2
D	1.58	±0.1
E	1.27	±0.1
K	0.91	±0.1
M	1.35	±0.1
N	0.66	±0.1

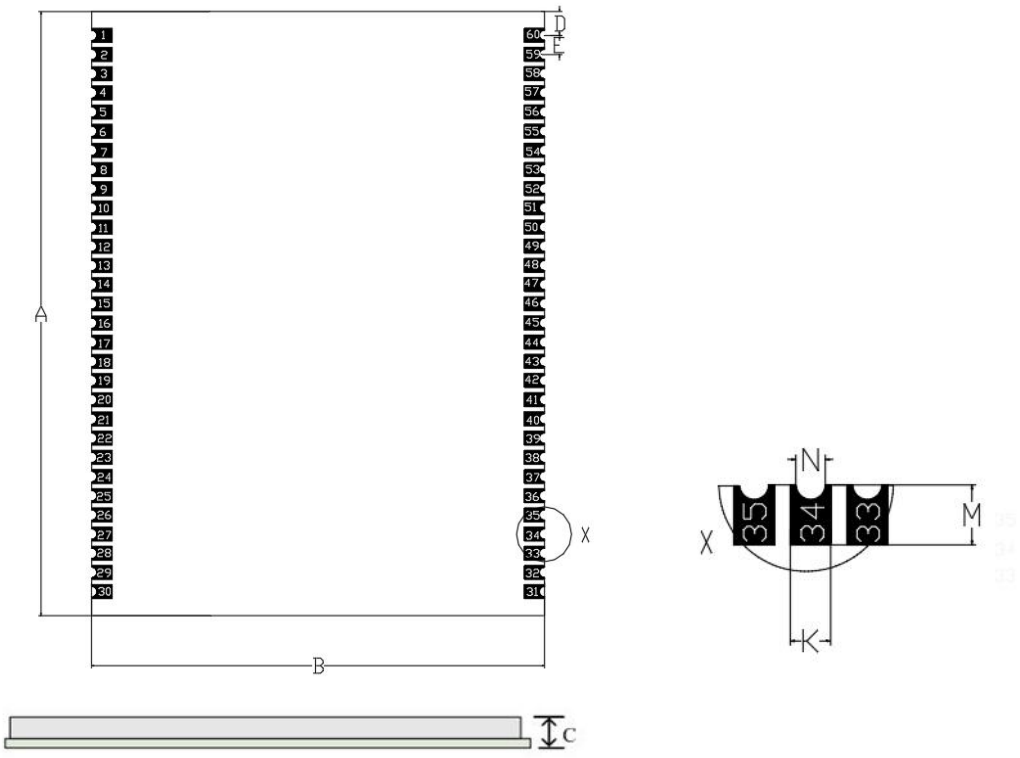

Figure 2-1 UM482 Mechanical Diagram

2.2 Pin Definition (Top View)

The UM482 has 2x30 pins, shown below.

Figure 2-2 UM482 Pin Diagram

2.3 Pin Function

Table 2-2 Pin Descriptions

No	Pin	I/O	Description
1	GND	-	Ground
2	ANT1_IN	I	GNSS antenna signal input (primary antenna)
3	GND	-	Ground

No	Pin	I/O	Description
4	GND	-	Ground
5	ANT1_PWR	I	GNSS antenna power supply (for separate heading antennae)
6	GND	-	Ground
7	ANT_NLOD	O	Primary GNSS antenna open circuit indicator 1: normal 0: antenna is open circuit
8	ANT_FFLG	O	Primary GNSS antenna short circuit indicator 1: normal 0: antenna is short circuit
9	GND	-	Ground
10	RSV	-	RSV
11	RSV	-	RSV
12	RSV	-	RSV
13	RSV	-	RSV
14	GND	-	Ground
15	SPEED	I	odometer- pulse (reserved)
16	FWR	I	odometer- direction (reserved)
17	V_BACKUP	I	When the main power supply of the module VCC is cut off, V_BCKP enables a separate power supply if provisioned to RTC and SRAM. Level requirements: 2.0~ 3.6 V, and the working current is about 10uA. Leave it open without using the hot start function
18	GND	-	Ground
19	PVT STAT	O	PVT positioning indicator, active-high. The module outputs high level when positioning is available and outputs low level when no positioning is proceeded.
20	GPIO2	I/O	General IO
21	RSV	-	RSV
22	FRESET_N	I	Reset to factory default (clear all user settings), LVTTL active-low, activate for longer than 5 seconds
23	ERR_STAT	O	Abnormal indicator, active-high. When the module self-diagnosis system fails, it outputs high level. Following completion of successful self-test ERR-STAT outputs low level
24	RTK_STAT	O	RTK positioning indicator, active-high. When the RTK solution is fixed, it outputs high level, alternatively it outputs low level when in other positioning states or no positioning is proceeded.
25	GND	-	Ground

No	Pin	I/O	Description
26	SPI_MISO	I	SPI data master input slave output
27	SPI_MOSI	O	SPI data master output slave input
28	SPI_CLK	O	SPI clock
29	SPI_SS0	O	SPI chip select 0
30	SPI_SS1	O	SPI chip select 1
31	3.3V_VCC	Power	Power Supply (+3.3V)
32	3.3V_VCC	Power	Power Supply (+3.3V)
33	GND	-	Ground
34	GND	-	Ground
35	TXD1	O	COM 1 transmit
36	RXD1	I	COM 1 receive
37	TXD2	O	COM 2 transmit
38	RXD2	I	COM 2 receive
39	TXD3	O	COM 3 transmit
40	RXD3	I	COM 3 receive
41	I2C_SDA	I/O	I2C data
42	I2C_SCL	I/O	I2C clock
43	GND	-	Ground
44	PPS	O	1 Pulse per second
45	EVENT	I	Event Mark
46	RST_N	I	Fast reset, will not clear user configurations. Active Low
47	GND	-	Ground
48	RSV	-	RSV
49	RSV	-	RSV
50	RSV	-	RSV
51	RSV	-	RSV
52	GND	-	Ground
53	ANT2_FFLG	O	Secondary GNSS antenna short circuit indicator 1: normal 0: antenna is short circuit
54	ANT2_NLOD	O	Secondary GNSS antenna open circuit indicator 1: normal 0: antenna is open circuit
55	GND	-	Ground
56	ANT2_PWR	I	Secondary GNSS antenna power supply
57	GND	-	Ground
58	GND	-	Ground
59	ANT2_IN	I	Secondary GNSS antenna signal (for Heading antenna)
60	GND	-	Ground

2.4 Electrical Specifications

Table 2-3 Absolute Maximum Ratings

Item	Pin	Min	Max	Unit
Power Supply (VCC)	Vcc	-0.3	3.6	V
Voltage Input	Vin	-0.3	VCC+0.2	V
Primary GNSS Antenna Power Supply	ANT1_PWR	-0.3	6	V
Primary GNSS Antenna Signal Input	ANT1_IN	-0.3	ANT1_PWR	V
Secondary GNSS Antenna Power Supply	ANT2_PWR	-0.3	6	V
Secondary GNSS Antenna Signal Input	ANT2_IN	-0.3	ANT2_PWR	V
RF Input Power Consumption of Primary antenna	ANT1_IN input power		+15	dBm
RF Input Power Consumption of Secondary antenna	ANT2_IN input power		+15	dBm
VCC Ripple (Rated Max.)	Vrpp	0	50	mV
Voltage Input (pins other than RXD1, RXD2, RXD3)	Vin	-0.3	3.6	V
Maximum ESD stress	VESD(HBM)		±2000	V

2.5 Operational Conditions

Table 2-4 Operational Conditions

Item	Pin	Min	Typical	Max	Unit	Condition
Power Supply (VCC)	Vcc	3.2	3.3	3.6	V	
Inrush current* (impulse current during power up)	Iccp			8.8	A	Vcc = 3.3 V
LOW Level Input Voltage	Vin_low_1	-0.3		VCC* 0.3	V	
High Level Input Voltage	Vin_high_1	VCC* 0.7		VCC+ 0.3	V	
LOW Level Output Voltage	Vout_low	0		0.45	V	Iout= 4 mA
High Level Output Voltage	Vout_high	VCC- 0.45		VCC	V	Iout =4 mA
Antenna Gain	Gant	20	30	36	dB	
Noise Figure	Nftot	2.5	3	3.5	dB	
Primary GNSS Antenna Power Supply	ANT1_PWR	3.3	5	5.5	V	< 100mA
Secondary GNSS Antenna	ANT1_PWR	3.3	5	5.5	V	< 100mA

Item	Pin	Min	Typical	Max	Unit	Condition
Power Supply						
Operating Temperature	Topr	-40		85	℃	
Power Consumption	P		2.0		W	

NOTE:
Since the product contains capacitors at the input, inrush current will occur during power-on. Evaluate in the actual environment in order to check the effect of the supply voltage drop due to the inrush current.

2.6 Physical Specifications

Table 2-5 Physical Specifications

Size	30×40×4 mm
Temperature	Operating : -40℃～+85℃
	Storage: -55℃～+95℃
Humidity	95% No condensation
Vibration	GJB150.16-2009, MIL-STD-810
Shock	GJB150.18-2009, MIL-STD-810

3 Hardware Design

3.1 Design in Considerations

- Supply stable power to the VCC pin. Connect all the GND pins to ground
- The module's VCC should be monotonic when powered on, the initial level should be lower than 0.4V, and the undershoot and ringing should be guaranteed to be within 5% VCC
- ANT1 and ANT2 MMCX interfaces supply +3.3~5.5 V feed. Fifty (50) ohm impedance matching for ANT1 and ANT2 is strongly recommended
- Ensure COM1 is connected to the host. COM1 is required for firmware upgrades.
- Only connect the module's reset pin FRESET_N to ensure complete reset of the module. It will restore the module to the manufacturing configuration.
- When ANT_NLOD, ANT_FFLG and antenna detection indication signal are connected, the IO of the client MCU terminal should be set as input and without any pull-up/down.

In order to obtain proper performance, special concerns should be paid during the design to the following:

- Power supply: A stable and low ripple power supply is necessary for good performance. Make sure the peak to peak voltage ripple does not exceed 50mVpp. It is recommended to use a power chip with current output capacity greater than 2A to power the board.
  - Use LDO to ensure the purity of the power supply
  - Try to place LDO close to the module in layout
  - Widen the tracks of power circuit or use copper pour surface to transmit current
  - Avoid walking through any high-power or high inductance devices such as a magnetic coil
- Interfaces: Ensure that the signals and baud rate of the main equipment match those of the UM482 module
- Antenna interface: Make sure the antenna impedance matches, and the cable is short without any kinks, try to avoid all acute angles
- Try to avoid designing in any circuits underneath UM482

This module is a temperature sensitive device, so dramatic changes in temperature will result in reduced performance. Keep it away as far as possible from any high-power high-temperature air and heating devices

3.2 UM482 Reference Design

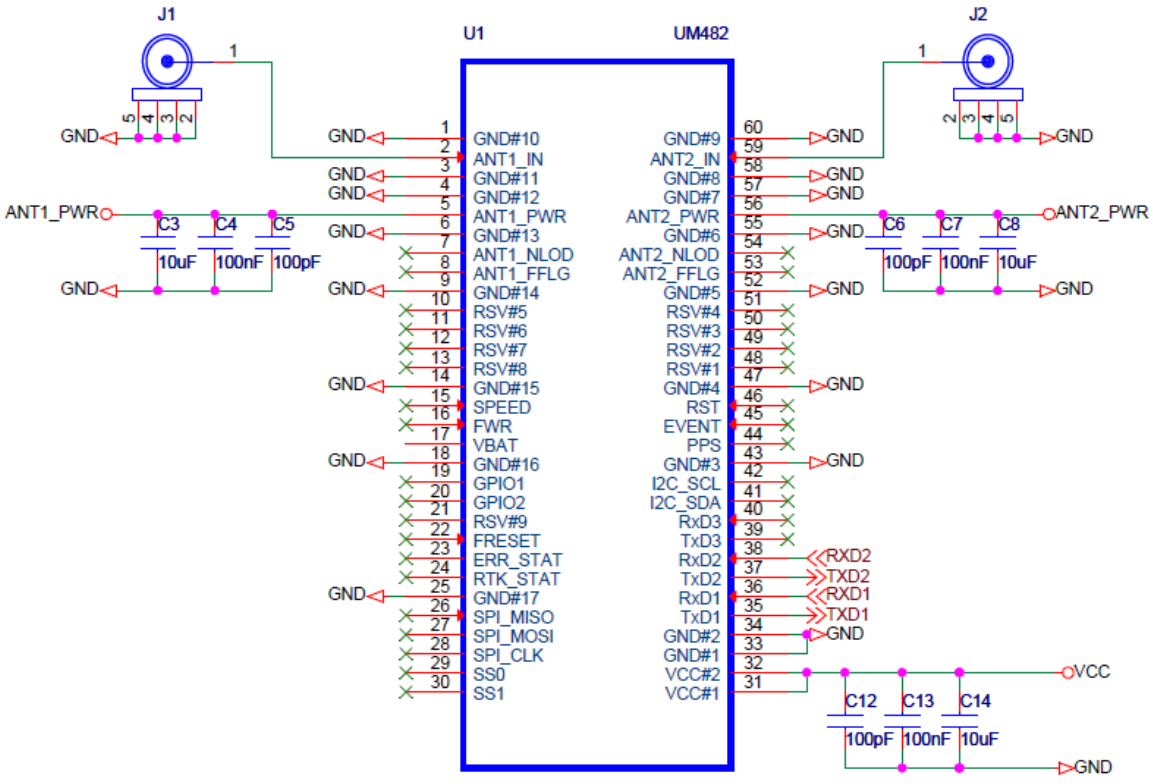

Figure 3-1 Minimum Reference Design

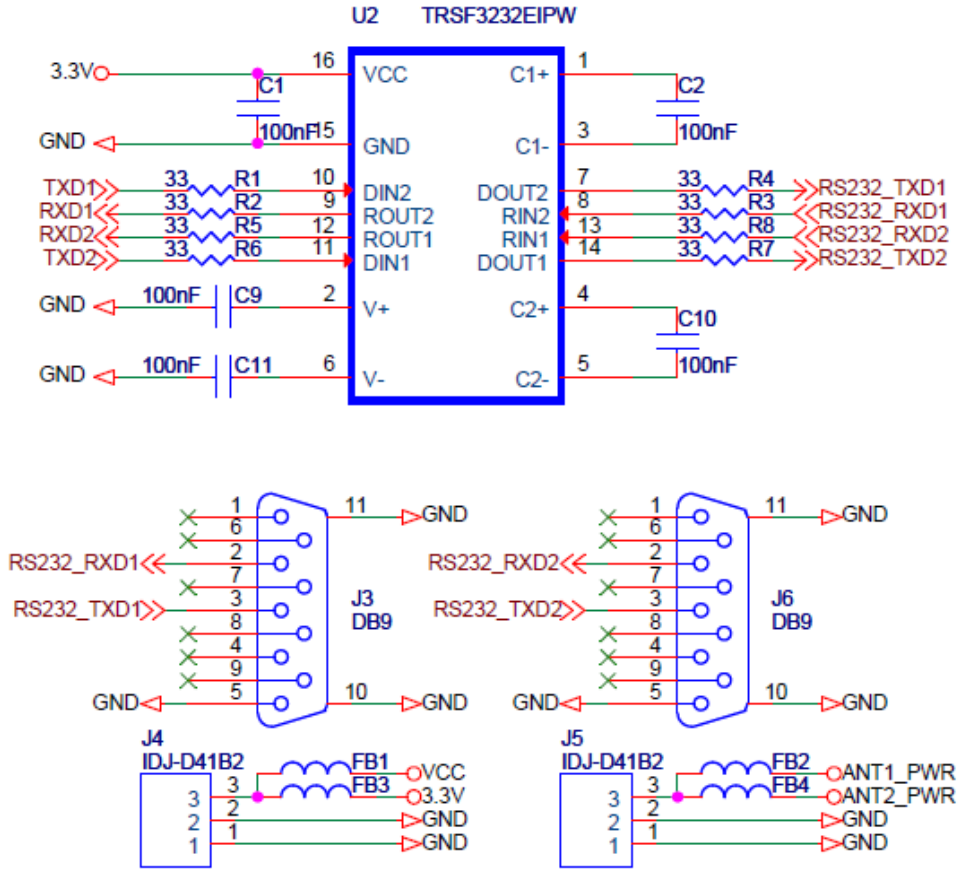

Figure 3-2 UM482 Reference Design

3.3 Pins

Table 3-1 Pin Sequence

	Pin Name	Pin	I/O	Description	Integration Notes
Power Supply	VCC	31, 32	power	Voltage Supply	Stable, clean, low ripple power supply - peak ripple power lower than 50mV is preferred
	ANT1_PWR ANT2_PWR	5, 46	power	Antenna Power Supply	Voltage supply for active antenna
	GND	1, 3, 4, 6, 9, 14, 18, 25, 33, 34, 43, 47, 52, 55, 57, 58, 60	power	Ground	Connect all the GND signals to ground. Better to use copper pour surface.

	Pin Name	Pin	I/O	Description	Integration Notes
Antenna	ANT1_IN, ANT2_IN	2, 59	I	Satellite signal input	50 Ω impedance matching
UART	TXD1	35	I	COM1 Transmit Data	COM1 output, leave unconnected if not used
	RXD1	36	O	COM1 Receive Data	COM1 input, leave unconnected if not used
	TXD2	37	I	COM2 Transmit Data	COM2 output, leave unconnected if not used
	RXD2	38	O	COM2 Receive Data	COM2 input, leave unconnected if not used
	TXD3	39	I	COM3 Transmit Data	COM3 output, leave unconnected if not used
	RXD3	40	O	COM3 Receive Data	COM3 input, leave unconnected if not used
System	FRESET_N	22	I	Hardware Reset (low effective)	FRESET_N requires more than 5s to reset the module to factory default. Don’t connect it if not used
	PPS	44	O	PPS signal	
	EVENT	45	I	EVENT signal	

3.4 PCB Packaging

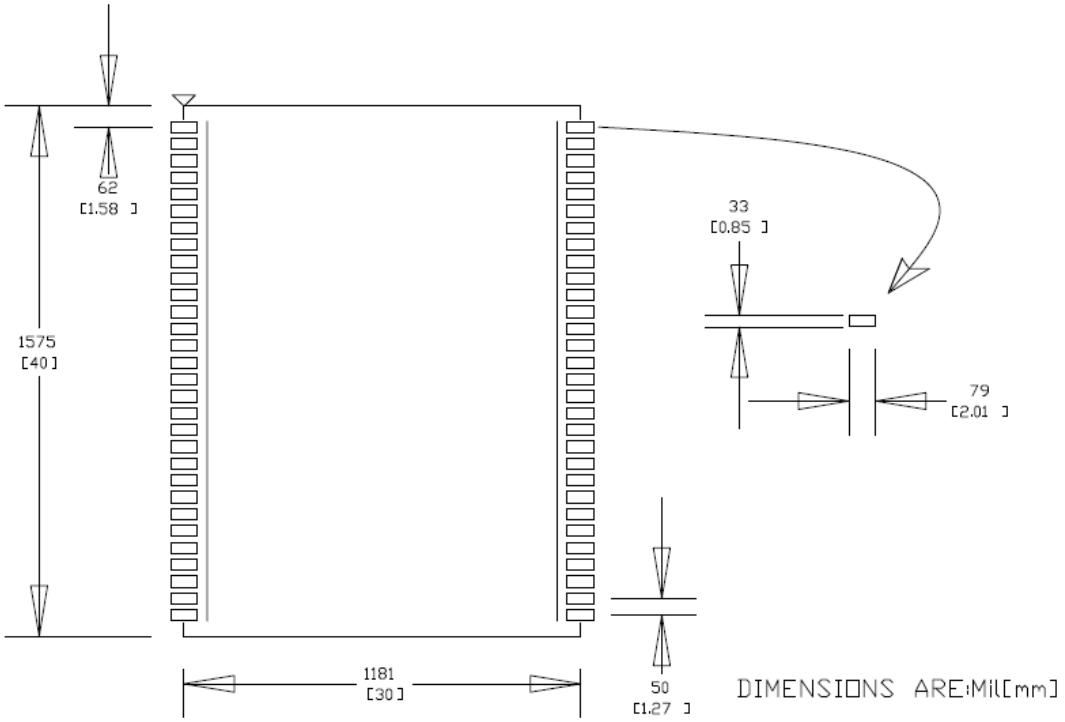

Figure 3-3 UM482 Recommended PCB Packaging (unit: mil, in brackets: mm)

3.5 Reset Signal

If the user resets the module via RST_N pin after power on, the pin should be used correctly in order for the UM482 module to perform normally. The RST_N and power supply must meet the following timing sequence requirement. The RST_N reset signal should last more than 5ms to be effective.

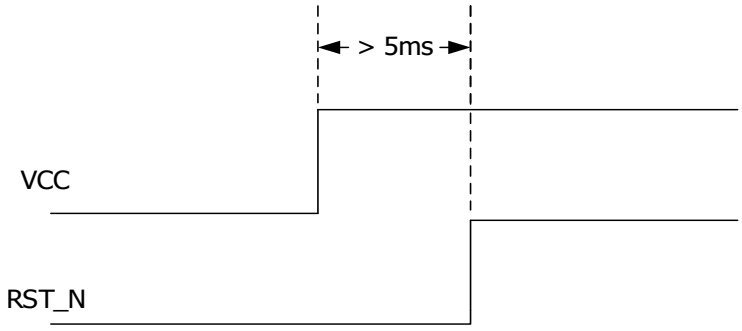

Figure 3-4 UM482 RST_N Timing Sequence

3.6 External Antenna Feed Design

UM482 feeds the antenna signals to the required circuits internally, but in order to effectively prevent damage from lightning and surges, circuit protection should be installed externally to protect the module.

High voltage and high-power protection chips should be used to feed the antenna from the outside of the module. Gas discharge tube, varistor, TVS tube and other high-power protective devices may be used in the antenna circuit to effectively improve the prevention against lightning stroke and surge.

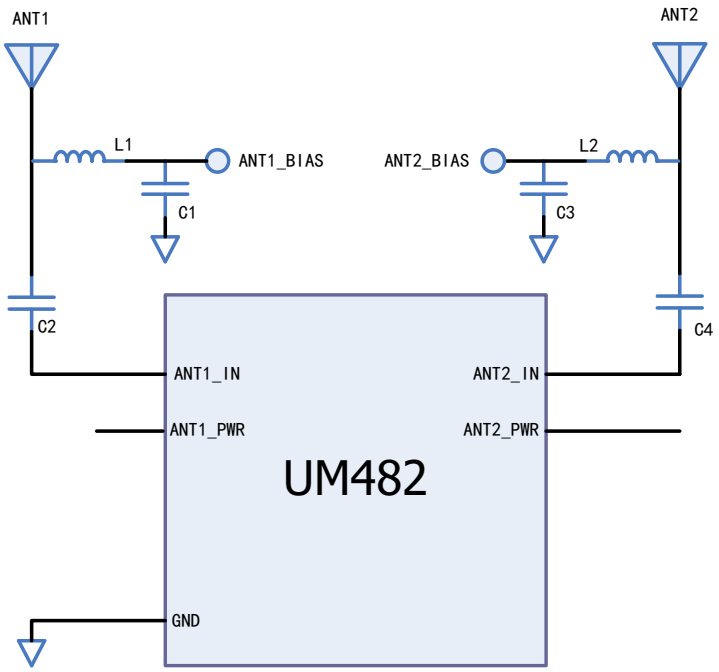

Figure 3-5 UM482 External Antenna Feed Reference Circuit

Remarks:

a) L1 and L2, feed inductor, 68nH RF inductor in 0603 package is recommended

b) C1 and C3, decoupling capacitor, it is recommended to connect two capacitors of 100nF/100pF in parallel;

c) C2 and C4, DC blocking capacitor, recommended 100pF capacitor.

4 Installation and Configuration

4.1 ESD Handling Precautions

UM482 Module is an ESD sensitive device and special precautions when handling are required.

- Electrostatic discharge may cause damages to the device. All operations mentioned in this chapter should be carried out on an antistatic workbench, wearing an antistatic wrist strap and using a conductive foam pad
- Hold the edge of the module, and do NOT directly touch the electronic components

The users may assemble UM482 flexibly according to the following application scenarios. The following figure shows a typical installation of the UM482 with Evaluation Kit (EVK).

4.2 Hardware Installation

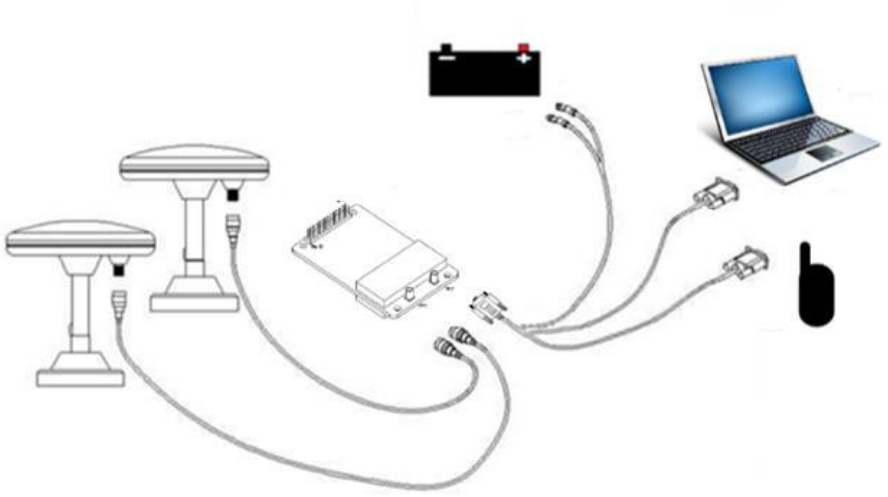

Figure 4-1 Typical Installation of UM482

Please inspect the shipping cartons for any signs of damage or mishandling before unpacking the UM482 package. The following items are required to install the UM482 correctly:

- UM482 EVK suite (or evaluation board)
- User manual
- UPrecise software
- Qualified antenna
- MMCX antenna cable

- PC or laptop with serial ports (Windows 7 or above), with UPrecise installed

Follow the steps below to install:

➢ Step 1: Fix UM482 board on the EVK with the holes and pins aligned accurately.

Figure 4-2 Installation Instruction

➢ Step 2: Choose the correct location for the antenna- this is critical for a high-quality installation. Poor or incorrect placement of the antenna can influence accuracy and reliability and may result in damage during normal operation. Use the coaxial radio frequency cable to connect the antenna connector of UM482 EVK;

NOTE: The RF connector on the board is MMCX - the suitable connecting wire should be selected according to the package. The input signal gain at the antenna interface is optimally between 20 and 36 dB. Please select the appropriate antenna, antenna cable and online LNA accordingly.

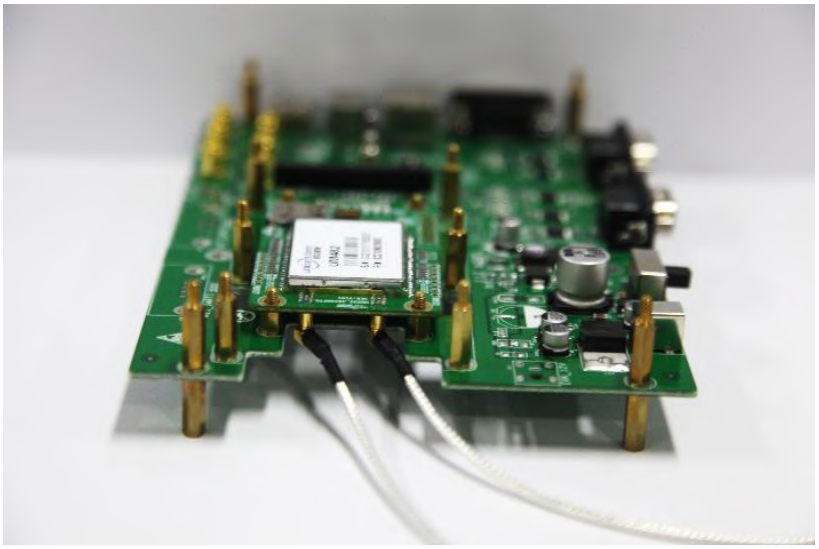

Figure 4-3 Connect the Antenna

- Step 3: Connect the PC to the EVK serial port through the serial cable;
- Step 4: Connect a 12V adapter to the EVK power input, and switch on the EVK;

Figure 4-4 Connect the Serial Port

- Step 5: Open the UPrecise software on the PC;
- Step 6: Configure the receiver through UPrecise software to send commands or to log data.

4.3 Power On

The UM482 power supply is 3.3V DC. Connect the corresponding serial ports and GNSS antenna before power up. After power-on, the receiver starts and can quickly establish communication. It also provides special testing tools for module testing.

4.4 Configuration and Output

UNICORECOMM UPrecise software provides a graphical interface to control and display the operation of the receiver. The features of UPrecise software include:

- Connecting and configuration of the receiver
- Constellation View: Graphic window to display Position of satellite, PRN, and Signal/Noise Ratio
- Trajectory View: The trajectory view for displaying the present point and the past point of the Receiver
- Logging Control View: Graphic interface for data logging
- Console View: Console window for sending command to the receiver
- Upgrading the firmware
- TTFF test

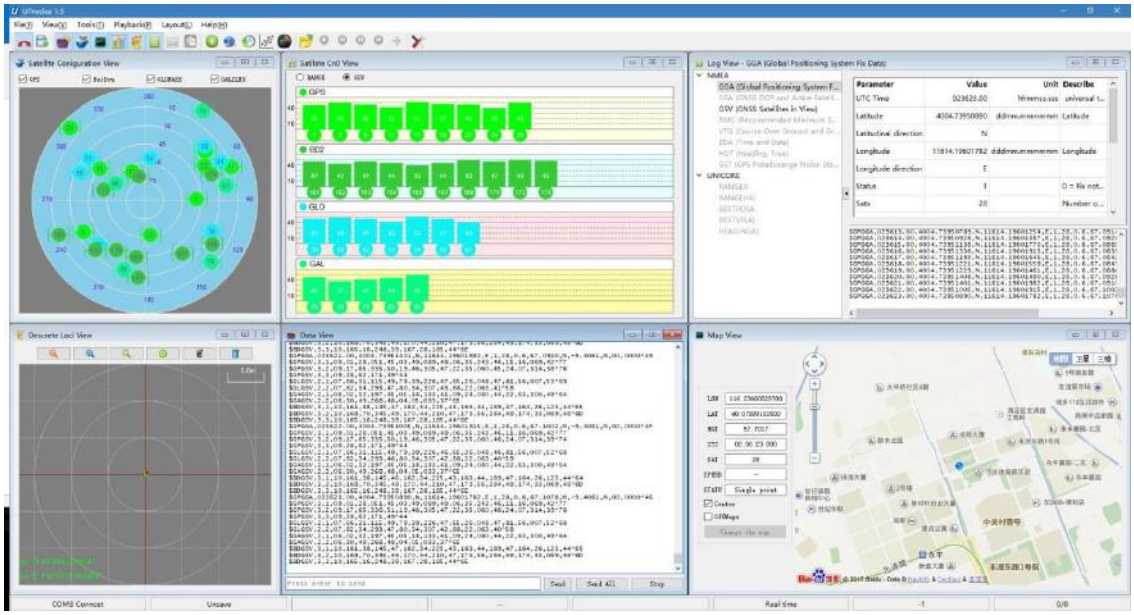

Figure 4-5 UPrecise Software

4.5 Operation Steps

1) Turn on the EVK. Click “file - > connect”. Set the baud rate: the default baud rate is 115200 bps

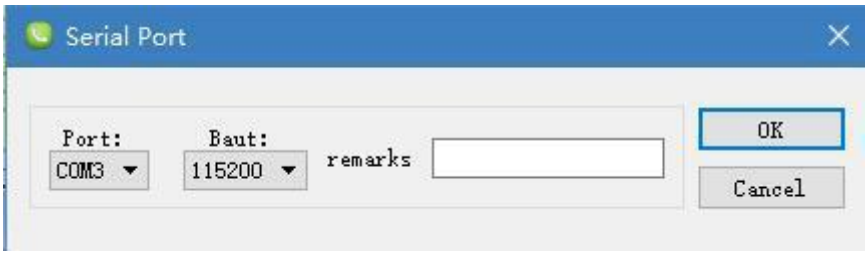

Figure 4-6 Connect the Serial Port

2) Click the “receiver settings” button to configure the NMEA message output

3) Click “send” button. It is recommended to first configure GPGGA, GPGSV, and other statements. Or in the dialog window, click on "Send all Message" to complete all the NMEA message output (default update rate 1Hz).

4) In the data session window right click to adjust output log font size, to stop / resume log output, or to clear log content

5) Configure or type commands using this UPrecise view.

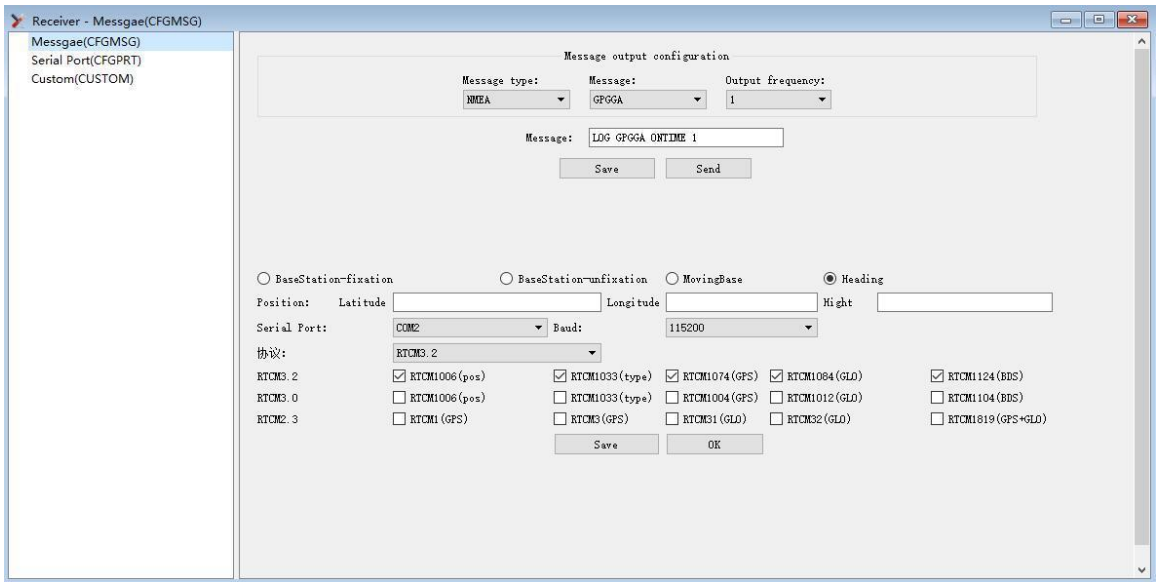

Figure 4-7 NMEA Data Output

6) Use various views of UPrecise to configure or input commands as required.

5 Configuration Commands

UM482 supports abbreviated ASCII format. All commands are composed of a log heading and configuration parameters.

Common instructions are shown in the following table:

Table 5-1 Common Instructions

Command	Description
freset	Reset to factory settings. Note: the factory set baud rate is 115200 bps.
version	Query the hardware version, firmware version of receivers
config	Current configuration of each port of the receiver
mask BDS	Mask (disable) tracking of Beidou satellite system. BDS, GPS, GLONASS and Galileo can be disabled separately
unmask BDS	Unmask (enable) tracking of Beidou satellite system. BDS, GPS, GLONASS and Galileo can be enabled separately. By default, all satellite systems are enabled.
config com1 115200	Set the baud rate of com1 to 115200. Baud rates of com1, com2 and com3 can be set to any of the following: 9600, 19200, 38400, 57600, 115200, 230400,460800
unlog	Disable all output of the current serial port
saveconfig	Save configuration to NVM (nonvolatile memory)
mode base time 60 1.5 2.5	Derive an average coordinate after 60 seconds, or after a “better than 1.5 meter horizontal and less than 2.5 meter vertical accuracy” is achieved within 60 seconds. When restarting after power off, the calculations will repeat and a new coordinate will be generated.
mode base lat Lon height	Mode base lat Lon height: Manually configure the coordinate: lat, lon, height Example: lat=40.07898324818, lon=116.23660197714, height=60.4265 Note: The latitude and longitude coordinates can be obtained through command bestpos. Lat or lon Negative means the location is in the southern hemisphere or in the western hemisphere
mode base	Config as base station
mode movingbase	Config as moving base
mode rover	Config as rover (default mode)

Command	Description
rtcm1033 comx 10 rtcm1006 comx 10 rtcm1074 comx 1 rtcm1124 comx 1 rtcm1084 comx 1 rtcm1094 comx 1	Set COMX, ICOMX, NCOMX to send differential message under base station mode. COMX could be either com1, com2, or com3.
NMEA0183 Output Message	
gpgga comx 1	Output GGA in 1Hz. Output data rate could be: 1, 0.2, 0.1, which corresponds to 1Hz, 5Hz, 10Hz respectively; Message types could be GGA, RMC, ZDA, VTG, NTR
gphdt comx 1	Output current heading information Heading information includes: HDT, TRA

5.1 Reference Station Configuration

The RTK base station should be static with a fixed and known position. The common instructions to set up an RTK base station configuration are:

1) If the precise coordinates are known, the precise coordinates could be set as in this example:

Table 5-2 Base Station Mode

Number	Command	Description
1	mode base 40.078983248 116.236601977 60.42	set latitude, longitude, and height
2	rtcm1006 com2 10	Reference station coordinate (including antenna height)
3	rtcm1033 com2 10	receiver and antenna description
4	rtcm1074 com2 1	GPS correction data
5	rtcm1124 com2 1	BDS correction data
6	rtcm1084 com2 1	GLO correction data
7	rtcm1094 com2 1	Galileo differential correction data
8	saveconfig	Save configuration

2) Self-Optimizing Base Station Mode: If there are no precise coordinates already available, select auto-fix option and the receiver will work for a certain period of time, and will then use the derived value as the base station coordinates. The most usual instructions are as follow:

Table 5-3 Self-Optimizing Base Station Mode

Number	Command	Description
1	mode base time 60 1.5 2.5	Within 60 seconds of the automatic positioning of the receiver, or when the standard deviation of horizontal positioning is no more than 1.5 m and that of vertical positioning is no more than 2.5 m, set the average value of horizontal and vertical positioning results as the fixed base station coordinates.
2	rtcm1006 com2 10	Reference station coordinates, including the antenna height
3	rtcm1033 com2 10	receiver and antenna description
4	rtcm1074 com2 1	GPS correction data
5	rtcm1124 com2 1	BDS correction data
6	rtcm1084 com2 1	GLO correction data
7	rtcm1094 com2 1	Galileo differential correction data
8	saveconfig	Save configuration

5.2 Rover Station Configuration

The RTK rover receives the differential correction data from the base station and synchronously receives satellite signals to process an RTK solution and finally RTK high precision positioning becomes available. Common instructions for RTK rover configuration are as follows:

MODE ROVER
GNGGA 1
SAVECONFIG

5.3 Moving Base Configuration

Different from RTK fixed base station, the moving base station is in motion and simultaneously sends satellite information to the rover station. The rover station receives both satellite observations and differential correction data sent from the moving base station to determine the relative position between the rover station and the moving base station. UM482 can adaptively recognize RTCM data input interface and format. Frequently used instructions for the moving base station are as follows:

Table 5-4 Moving Base Station Mode

Number	Command	Description
1	mode movingbase	Set the moving base station mode
2	rtcm1006 com2 1	Base station antenna coordinates (include antenna height)
3	rtcm1033 com2 1	Description of receiver and antenna
4	rtcm1074 com2 1	GPS system correction data
5	rtcm1124 com2 1	BDS system correction data
6	rtcm1084 com2 1	GLONASS system correction data
7	rtcm1094 com2 1	Galileo system correction data
8	saveconfig	Save configuration

5.4 Heading Configuration

This command is used for dual-antenna receivers (UB482, UM482, UM442). The heading result is the angle from True North to the baseline of the ANT1 to ANT2 in a clockwise direction. The heading function is enabled by default settings. See Figure 5- 1 Heading Schematic for the schematic.
Frequently used commands are as follows:

GPHDT 1
SAVECONFIG

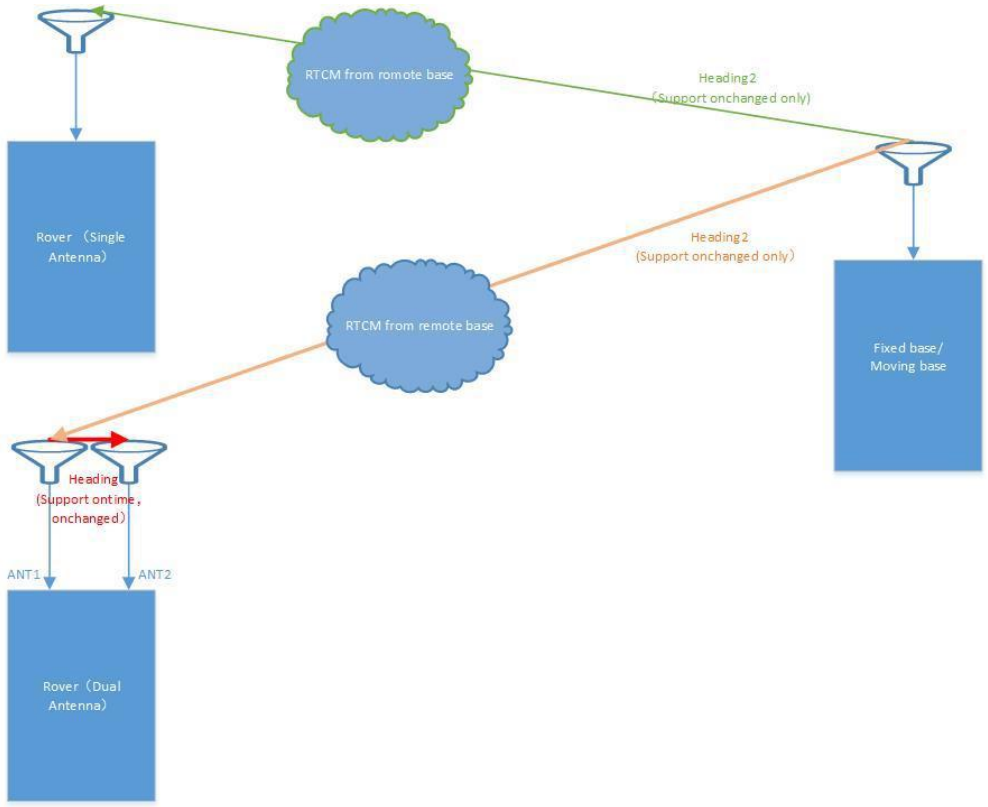

Figure 5- 1 Heading Schematic

5.5 Heading2 Configuration

The heading2 result is the angle from True North to the baseline of the base to rover in a clockwise direction. Dual-antenna heading receiver (UB482, UM482, UM442) supports heading2. The heading2 for the dual-antenna receiver is the angle from True North to the baseline of the Base to ANT1 in a clockwise direction. Please refer to Figure 5- 1 Heading Schematic for the detailed schematic.
Frequently used commands are as follows:

MODE HEADING2
GPHDT2 ONCHANGED
SAVECONFIG

6 Antenna Detection

UM482 supports dual-antenna detection. The 2-bit detection signals are described below:

Table 6-1 2-bit Detection Signals

ANT_NLOD	ANT_FFLG	Status	Status Description
1	1	On	Normal
0	1	Open	Antenna circuit is open
1	0	Short	Antenna circuit is short
0	0	RSV	RSV

If the ANT_PWR is not powered correctly or if the antenna is not fed by ANT_PWR, the detection results are invalid.

7 Firmware Upgrade

Upgrading UM482 may be done using UPrecise software:

Click "…" to browse the firmware update package, and click "Start" button to start the firmware upgrading process (don't select "Reset" checkbox):

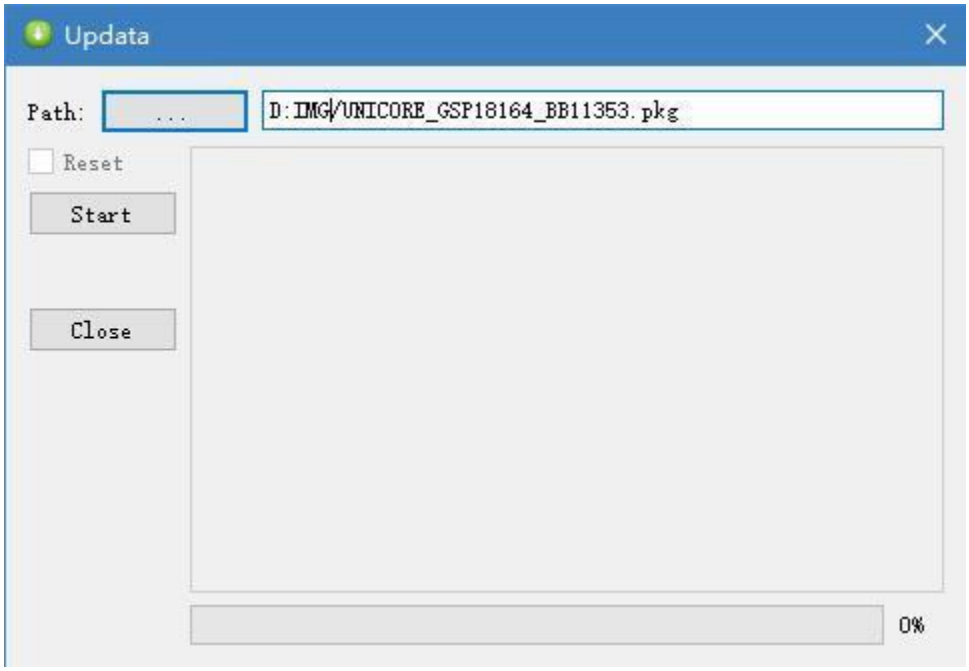

Figure 7- 1 Update Interface

In general, the upgrade time is within 5minutes.

Note: Please use COM1 for firmware upgrade

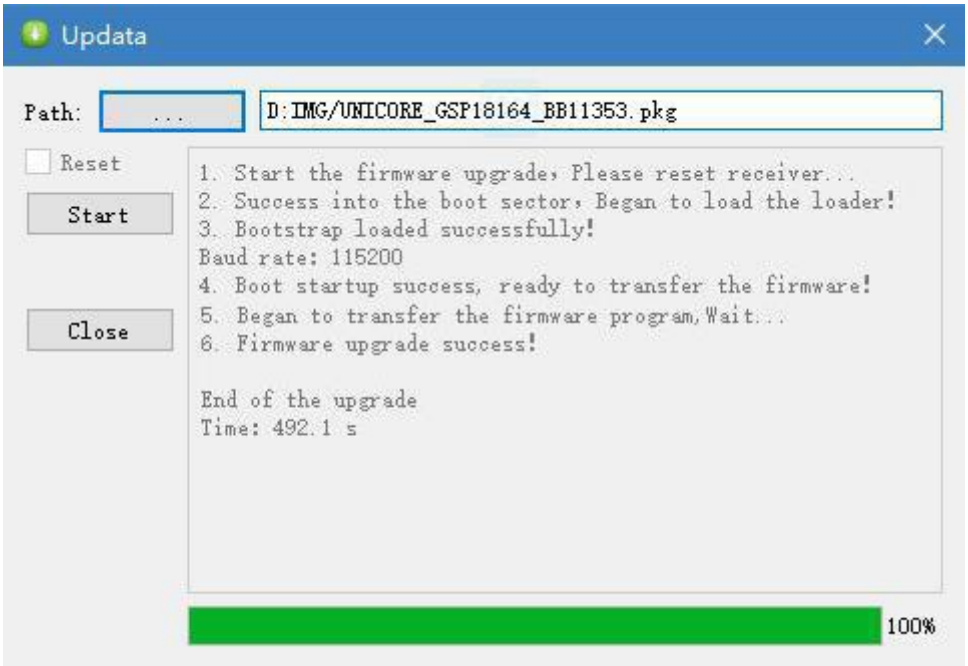

Figure 7- 2 Update Complete

8 Soldering Recommendation

Recommended thermal cycle curve is as follows:

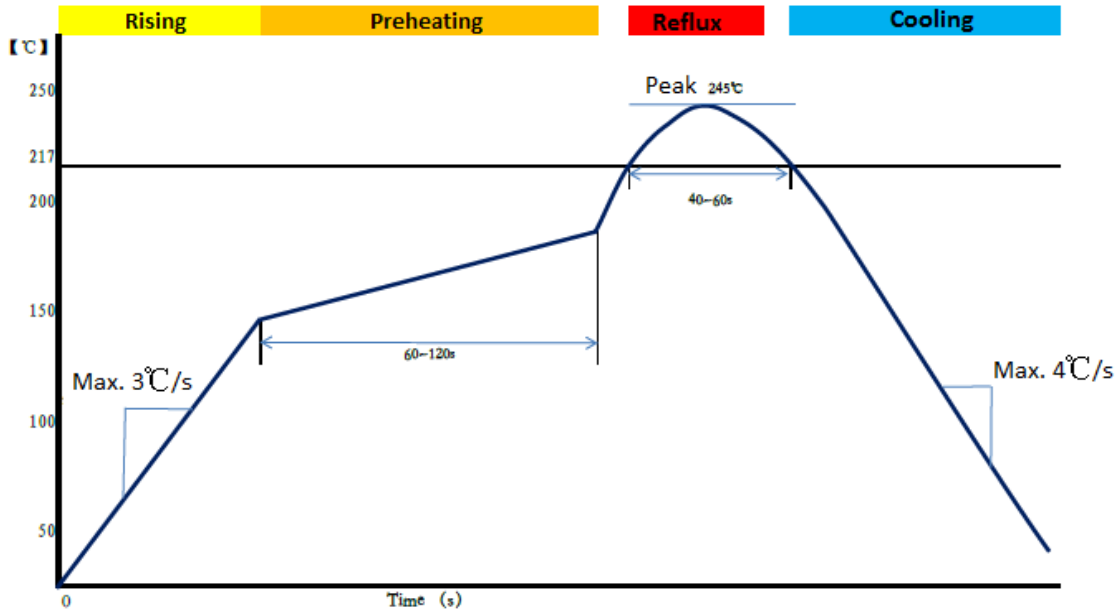

Figure 8- 1 Soldering Temperature

- Temperature rising Stage

Rising slope: Max. 3℃/s

Rising temperature range： 50℃-150℃

- Preheating stage

Preheating time: 60 – 120 s

Preheating temperature range: 150 - 180℃

- Reflux Stage

Over soldering temperature (217℃) time: 40 – 60 s

Peak temperature: no higher than 245℃

- Cooling Stage

Cooling Slope: Max. 4℃ / s

Notes:

• In order to prevent fall off during soldering of modules, please avoid soldering the module in the back of the Board during design, that is, better not go through soldering cycle twice

• The setting of temperature depends on many factors - such as type of Board, solder paste type, solder paste thickness etc. Please also refer to the relevant IPC standards and indicators for solder paste.

• Since the lead-free soldering temperatures are relatively low, if using this soldering method, please give priority to other components on the Board.

9 Packaging

There are 150 pcs UM482 modules inside the package box.

Table 9-1 Packaging Instructions

Packaging	Description
Box	5 trays in the box
Tray	30 pcs modules on a tray

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