INSTALLATION AND OPERATION

QUICK GUIDE

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UM220-IV NK EVK

Navigation and Positioning Module

Evaluation Kit

Revision History

Version	Revision History	Date
R1.2	First edition.	Jan. 2026

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Foreword

This manual provides information about the Unicore UM220-IV NK EVK and can be used in conjunction with the Unicore *UPrecise User Manual*.

Target Readers

This manual is intended for use by technicians with expertise in GNSS modules.

Contents

1 Overview

The UM220-IV NK evaluation kit (hereinafter referred to as EVK) is mainly used for testing and evaluating the function and performance of the UM220-IV NK module for user convenience.

The delivered package contains:

Table 1-1 UM220-IV NK EVK Accessory List

Type	Contents	Quantity
Main device	UM220-IV NK EVK	1
Accessory	GNSS single-frequency antenna - JCA236	1
Accessory	Micro-B USB cable	1

2 EVK Introduction

The figure below shows the appearance of the UM220-IV NK EVK.

Figure 2-1 UM220-IV NK EVK

3 Interfaces & Indicators

The interfaces and indicators of the UM220-IV NK EVK are shown below. For the detailed description, see **Table 3-1**.

Figure 3-1 UM220-IV NK EVK Interfaces & Indicators

Table 3-1 UM220-IV NK EVK Interfaces & Indicators

Interface/ Indicator	Type	Description
S1	Reset	Reset the module by the jumper cap
S2	Antenna bias	Control the antenna bias power on and off by the jumper cap
L1	Power/1PPS indicator	Lights up when powered on; flashes when the 3D positioning is effective.
ANT	RF signal input connector	Antenna signal input
FWD	Direction signal connector	Reserved for odometer directional signal input. **UM220-IV NK EVK does not support this interface.**
L2	Speed pulse signal indicator	Reserved. This indicator flashes when receiving the speed pulse signal. **UM220-IV NK EVK does not support this interface.**
SPD	Speed pulse signal connector	Reserved for odometer speed pulse signal input. **UM220-IV NK EVK does not support this interface.**
USB	Micro-USB connector	Power supply (+5V) and data communication
SD-card	SD card slot	For installing an SD card
UART	Communication DB9 connector	Reserved as an auxiliary serial communication interface (RS232 level). **UM220-IV NK EVK does not support this interface.**

4 Installation & Configuration

4.1 Preparation

The UM220-IV NK EVK requires an external antenna, power supply, and input of standard RTCM 3.2 differential data for RTK positioning.

- Select a high-precision antenna with a good phase center, ensuring minimal loss in the overall RF link.
- Ensure that under open sky conditions, approximately 20 satellites have a C/N0 exceeding 40 dB-Hz to obtain high-precision RTK positioning service.
- The differential data source must provide continuous and stable standard RTCM service. The data should be input into the EVK's serial port via transmission software and must include observation data for GPS, BDS (including all satellites No. 1-63), Galileo, QZSS, as well as reference station coordinate information.

4.2 Installation

Step 1: Ensure adequate anti-static measures, such as wearing an anti-static wristband and grounding the workbench.

Step 2: Use the GNSS antenna in the evaluation kit or use another GNSS antenna with appropriate gain (the GNSS frequencies supported by the antenna shall be in line with that of the module) and fix it in a non-blocking area; connect the antenna to the ANT port on the evaluation box.

Step 3: Connect the evaluation box to a PC through the USB Micro-B cable.

Step 4: Open the UPrecise software on the PC.

Step 5: Control the receiver via UPrecise to view the constellations, data stream, tracking status, map, etc. For more information, please refer to *UPrecise_User Manual*.

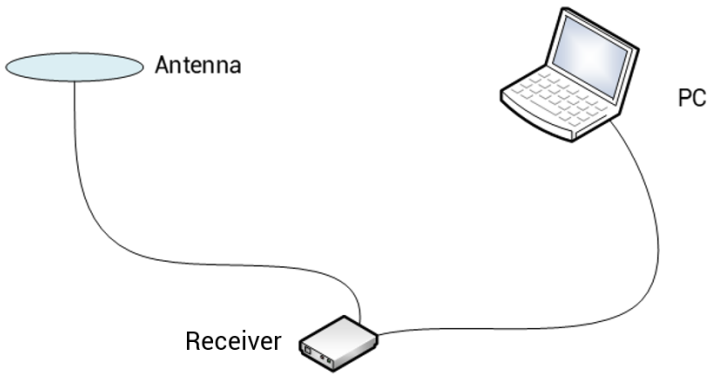


Figure 4-1 Installation of the EVK

4.3 Differential Data Source Configuration

Unicore provides the GNSS evaluation software UPrecise, which can be used for transmitting differential correction data to achieve RTK positioning.

The operation steps are as follows:

1. Visit the Unicore website (https://en.unicore.com/) and download the UPrecise software installation package.

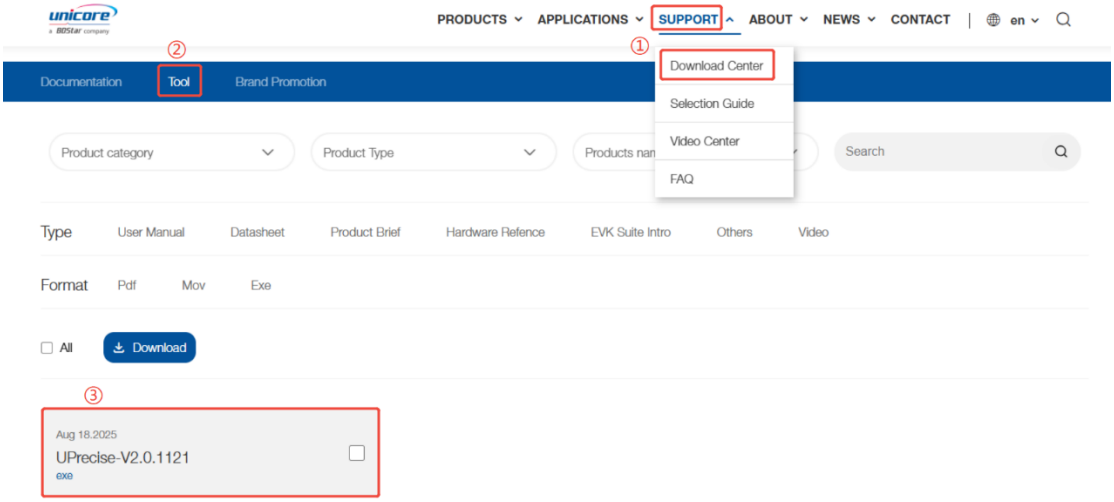


Figure 4-2 Download the UPrecise Software Installation Package

2. After installation, launch the software.
3. Select the serial port connected to the receiver and click "Connect".

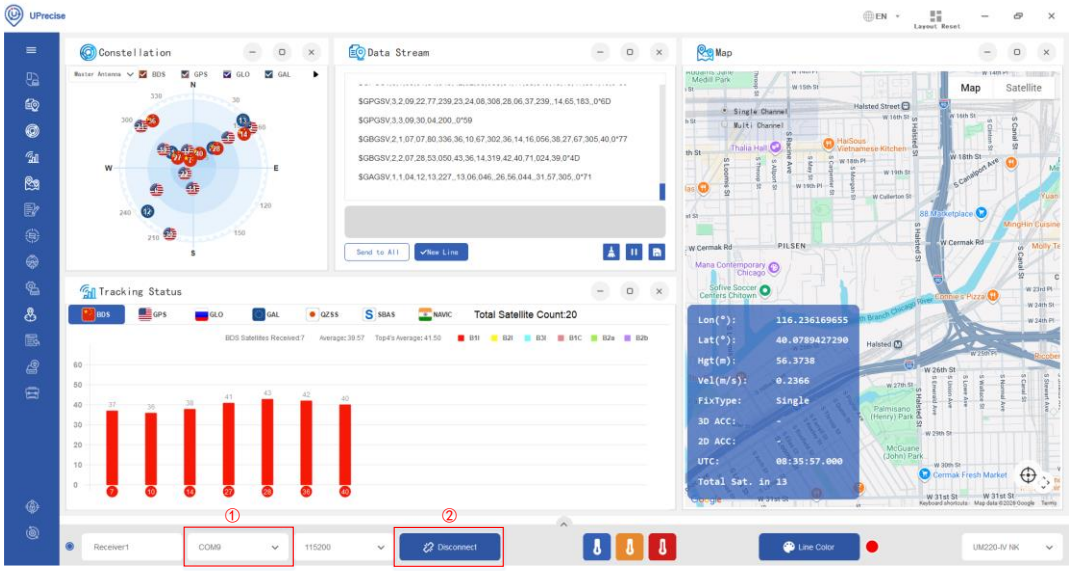


Figure 4-3 Connect to the Receiver

4. Click the "Tools" in the menu bar, then select the "RTCM" to open the “RTCM Monitor" window.

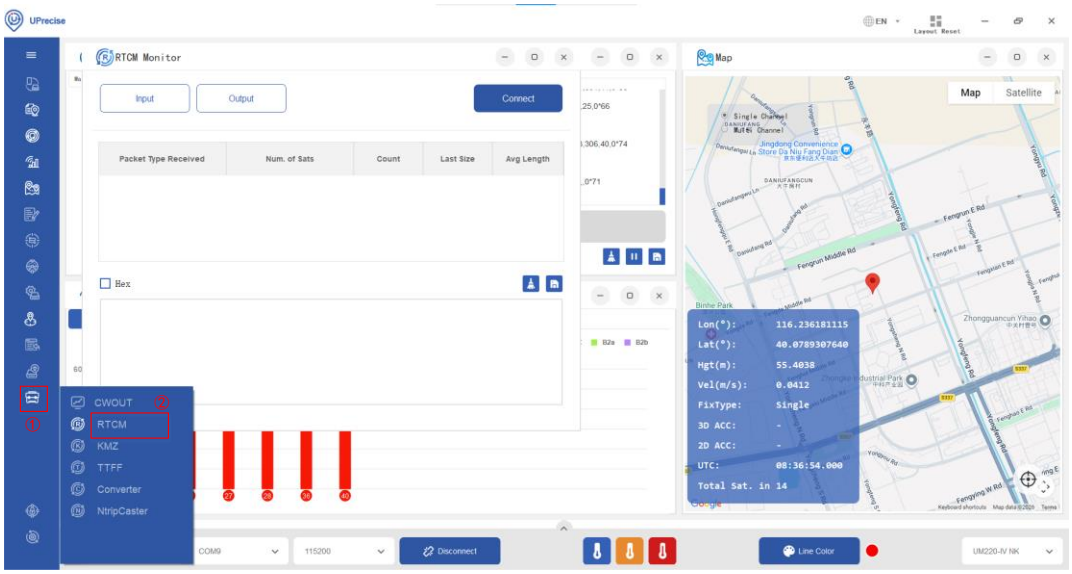


Figure 4-4 Open RTCM Monitor

5. Click the "Input" button and select a differential data input method. This choice depends on the user's server type. "Ntrip Client" is recommended.

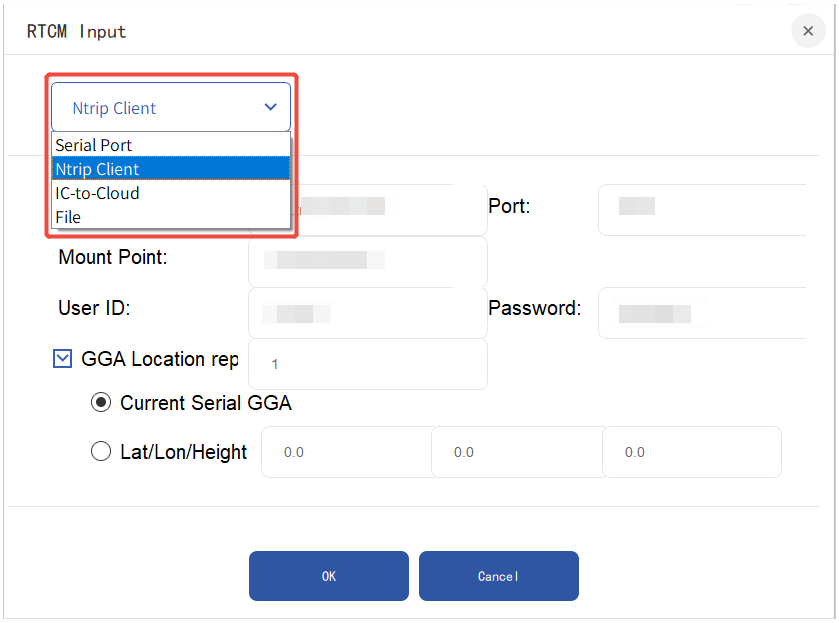


Figure 4-5 Configure RTCM Input Method

Table 3-1 RTCM Input/Output Configuration

Receiver Purpose	Input	Output
Receiver as base station	Serial Port	Ntrip Server
Receiver as rover	Ntrip Client IC-to-Cloud File	Serial Port

☞ The IC-to-Cloud integration is provided by Unicore and TruePoint jointly. Through an integrated SDK, the receiver can access the TruePoint cloud platform and achieve more precise and faster positioning. The UM220-IV NK does not currently support the IC-to-Cloud integration.

☞ If "File" is selected, the file content must adhere to the RTCM standard protocol, and the RTCM Monitor tool will replay the data second-by-second according to the timestamps contained in the file.

6. If "Ntrip Client" is selected, enter the Ntrip caster's address, port number, mount point, username, and password. Check the "GGA Location Reporting" box, then click "OK".

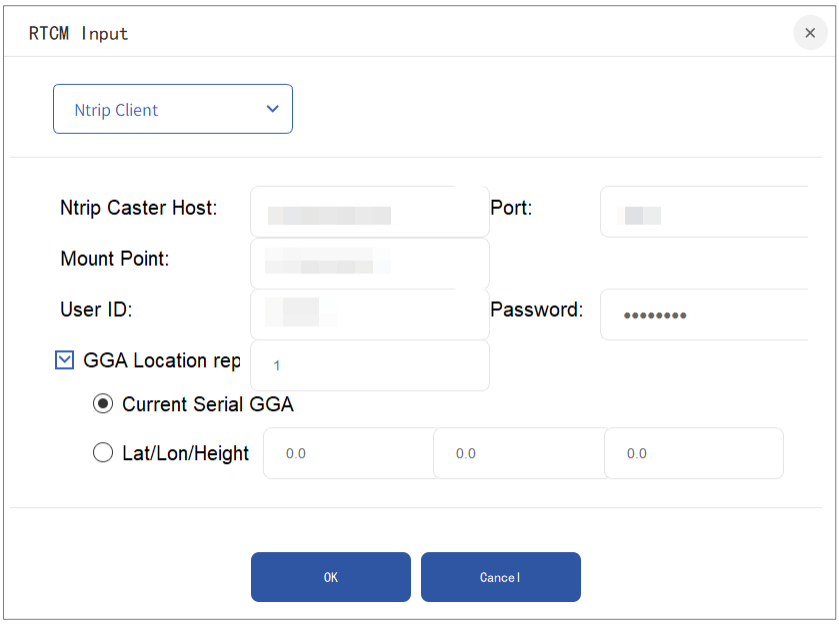


Figure 4-6 Configure the Ntrip Client

7. Click the "Output" button to configure the serial port number and baud rate for differential data output, then click "OK".

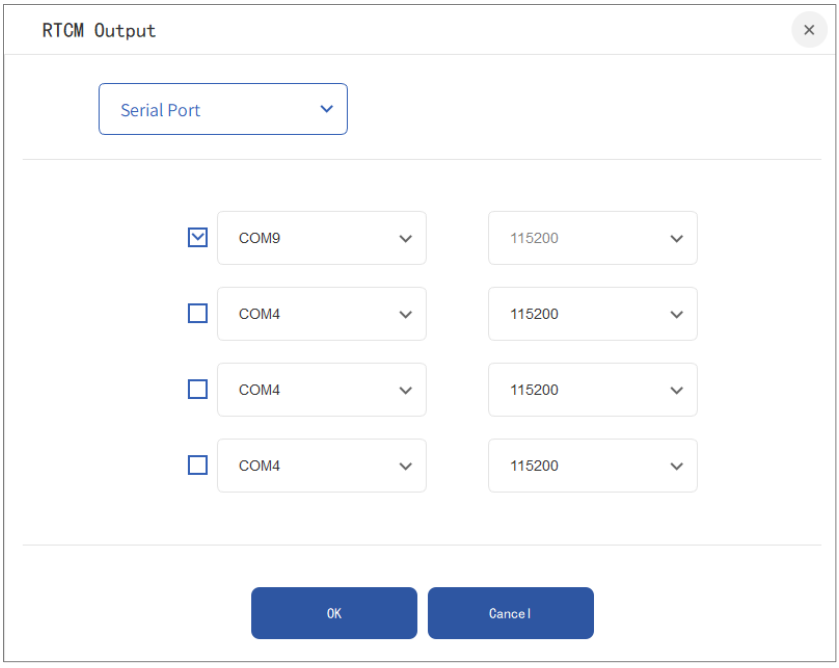


Figure 4-7 Configure the Output Serial Port

8. After all configurations are completed, check the "Hex" (hexadecimal) box, then click the "Connect" button to receive RTCM data.

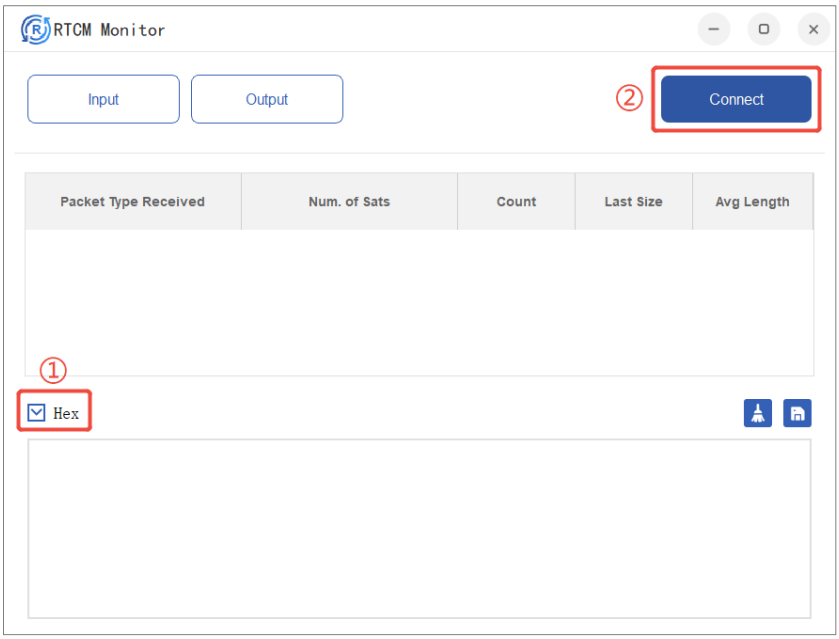


Figure 4-8 Click the "Connect" Button to Receive RTCM Data

4.4 Positioning Result Description

In the **GGA** message, a positioning flag of **5** indicates a float solution, and a positioning flag of **4** indicates an RTK fixed solution.

For detailed description of the **GGA** message, please refer to the *UM220-IV NK Protocol Specification*.

```
$GNRMC,023125.00,A,4004.73778,N,11614.19034,E,0.012,,061120,,,D,V*11
$GNGGA,023125.00,4004.73778,N,11614.19034,E,4,36,0.49,58.0,M,,M,2,0000*59
$GNGSA,A,3,02,05,13,15,18,29,30,20,,,0.84,0.49,0.68,1*20
$GNGSA,A,3,06,08,09,13,16,20,25,27,29,30,32,38,0.84,0.49,0.68,4*0B
$GNGSA,A,3,04,09,11,12,19,36,,,,,,,0.84,0.49,0.68,3*0F
$GPGSV,3,1,12,02,29,140,43,05,48,065,47,13,76,090,46,15,60,224,46,0*6A
$GPGSV,3,2,12,18,32,312,42,20,10,281,31,29,40,244,44,30,19,054,39,0*6E
$GPGSV,3,3,12,23,08,276,,193,69,077,45,199,42,163,38,195,25,169,40,0*51
$GBGSV,5,1,20,01,34,140,43,02,34,225,39,03,45,188,44,04,25,123,39,0*75
$GBGSV,5,2,20,05,17,249,37,06,63,191,46,08,70,110,44,09,36,205,40,0*72
$GBGSV,5,3,20,13,80,336,47,16,58,198,45,20,35,265,44,23,15,113,41,0*71
$GBGSV,5,4,20,25,14,063,39,27,24,176,42,29,29,309,43,30,54,238,46,0*78
$GBGSV,5,5,20,32,72,359,47,38,80,112,48,39,49,210,45,12,,,26,0*42
$GAGSV,2,1,06,04,79,251,48,09,24,234,38,11,67,293,43,12,50,158,42,0*72
$GAGSV,2,2,06,19,38,049,40,36,18,318,39,0*74
```

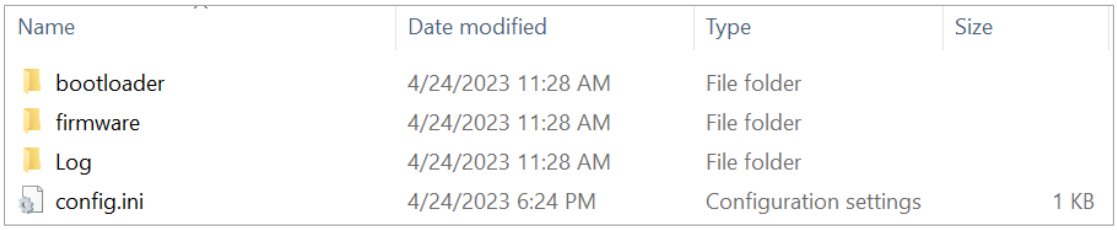
Figure 4-9 Positioning Result Description

4.5 SD Card Instructions

There is an SD card slot on the UM220-IV NK EVK, which can be used for data storage and firmware upgrade.

4.5.1 SD Card Folder

Before using the SD card, you need to copy the zipped folder **UM220-IV N_EVK_V2.0_sdcard** to the card. The folder contains the following items:



Name	Date modified	Type	Size
bootloader	4/24/2023 11:28 AM	File folder	
firmware	4/24/2023 11:28 AM	File folder	
Log	4/24/2023 11:28 AM	File folder	
config.ini	4/24/2023 6:24 PM	Configuration settings	1 KB

Figure 4-10 Contents in the SD Card Folder

1. The “bootloader" folder is used for storing the module's loader file.

☞ The bootloader folder already contains the default loader file, which can be used directly.

2. The “firmware" folder is used for storing the firmware file.
3. The “Log" folder is used for storing data during module operation.
4. The “config.ini" is the configuration file. Its contents are shown below:

```
################################################################################
#Description of the configuration items:
#1. SingleFileSize: It specifies the size of a single file. If the file size exceeds the specified one, a new file will be created.
#   Notes: Hexadecimal format is not supported; please convert the size to a decimal number.
#
#2. StartRecordStyle: It defines the recording style after starting up, either to create a new file or append to the existing file.
#   When the value = append, the data will be logged in the existing file; when the value = new, the data will be logged in a new file.
#
#3. The character '#' at the beginning of a line means that the line is a comment.
################################################################################
[config]
SingleFileSize = 512000000

#(new or append)
StartRecordStyle = new

WorkBaudrate = 115200

LogFileName = log

#When the value is 1, the firmware will be upgraded; otherwise, it will not be upgraded.
update = 0
```

Figure 4-11 Contents in the config.ini File

Table 4-1 Description of the config.ini File

Contents	Description
[config]	/
SingleFileSize = 512000000	The size of a single file. If the file size exceeds the specified number, a new file will be created. (Hexadecimal format is not supported; please convert the size to a decimal number.)

Contents	Description
StartRecordStyle = new	The recording style after starting up (new or append): Append = log data in the existing file; New = log data in a new file.
WorkBaudrate = 115200	The working baud rate of UM220-IV NK module
LogFileName = log	The name of the log file
update = 0	1 = Upgrade the firmware; 0 = Do not upgrade the firmware

4.5.2 Data Storage Instructions

Step 1: Insert the SD card into the PC, and copy the zipped folder **UM220-IV N_EVK_V2.0_sdcard** to the card.

Step 2: Unzip the folder and open the "config.ini" file. Set the "update" value to 0, set the "WorkBaudrate" the same as that of the UM220-IV NK module, and set other parameters as needed (see **Table 4-1** for more information).

Step 3: Remove the SD card from the PC, insert it into the EVK, and power on the EVK[1].

Step 4: Waiting for a while and you can get the logged data in the SD card. You may also use a port monitor tool to check the data transmission status.

4.5.3 Firmware Upgrade Instructions

Step 1: Insert the SD card into the PC, and copy the zipped folder **UM220-IV N_EVK_V2.0_sdcard** to the card. Unzip the folder and open the "bootloader" to make sure that it contains the loader file. Then, put the firmware file[2] in the "firmware" folder.

☞ For the bootloader and firmware folders, only one file can be stored in each folder.

Step 2: Open the "config.ini" file, and set the "update" value to 1.

Step 3: Remove the SD card from the PC, insert it into the EVK, and power on the EVK.

Step 4: During upgrade, the indicator L1 is off. After the upgrade is finished, the light turns on. You may also use a port monitor tool to check the upgrade status.

[1] If the antenna is not connected, the EVK will output debug information; if positioning information is needed, please connect the antenna before powering on.

[2] Please contact Unicore to get the latest firmware.

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