

This document will lead you get ephemeris data and receiver data by using the SkyTraQ Venus 8 GNSS Receiver. Then process the binary data which is received from the satellites into eph.dat and rcvr.dat.

- **Before start**

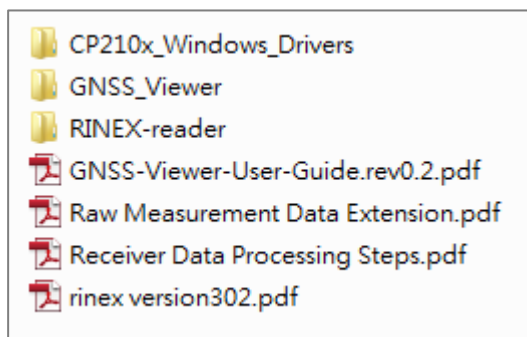
Make sure you have:

1. Antenna x1
2. Board x1
3. Mini USB cable x1



From the compress file which you download from Moodle includes:

1. CP210x_Windows_Drivers (file)
2. GNSS_Viewer (file)
3. RINEX-reader (file)
4. GNSS-Viewer-User-Guide.rev0.2 (.pdf)
5. Raw Measurement Data Extension (.pdf)
6. rinex version302 (.pdf)
7. Receiver Data Processing Steps (.pdf)

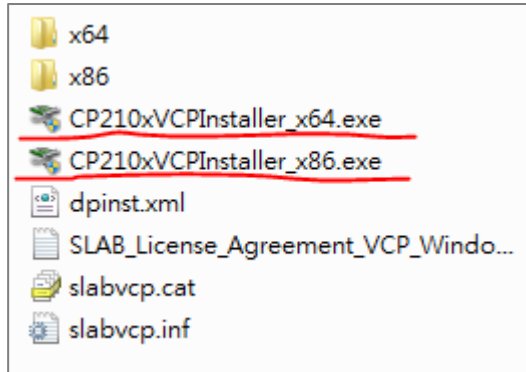


- **Driver installation**

Because the GNSS device use USB to connect PC, USB driver will need to be installed.

In “CP210x_Windows_Drivers” file, run the corresponding execution file.

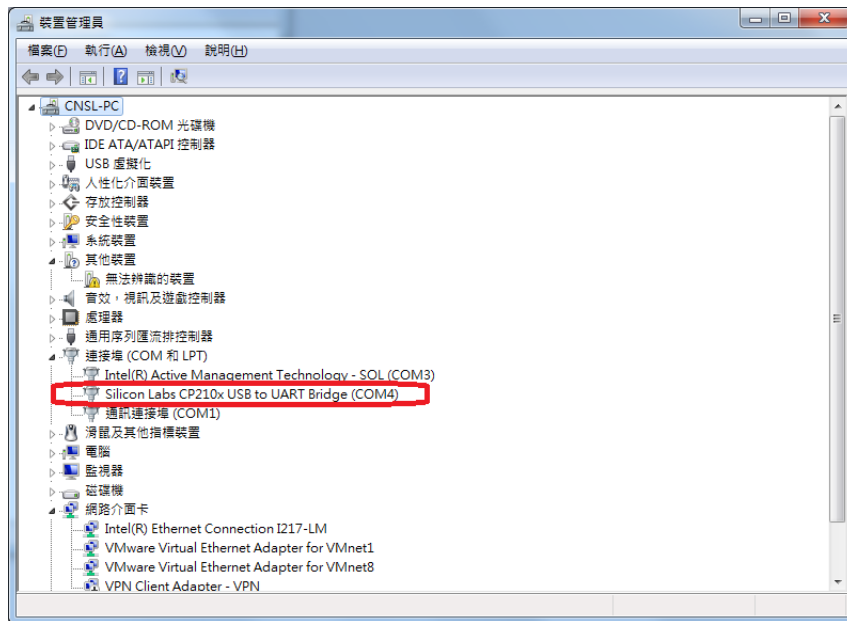
(CP210xVCPInstaller_x64.exe or CP210xVCPInstaller_x86.exe)



- **Connect GNSS Device to PC**

1. After USB driver installation, connect GNSS device to PC using USB cable. The created virtual COM port number can be seen from the Device Manager.

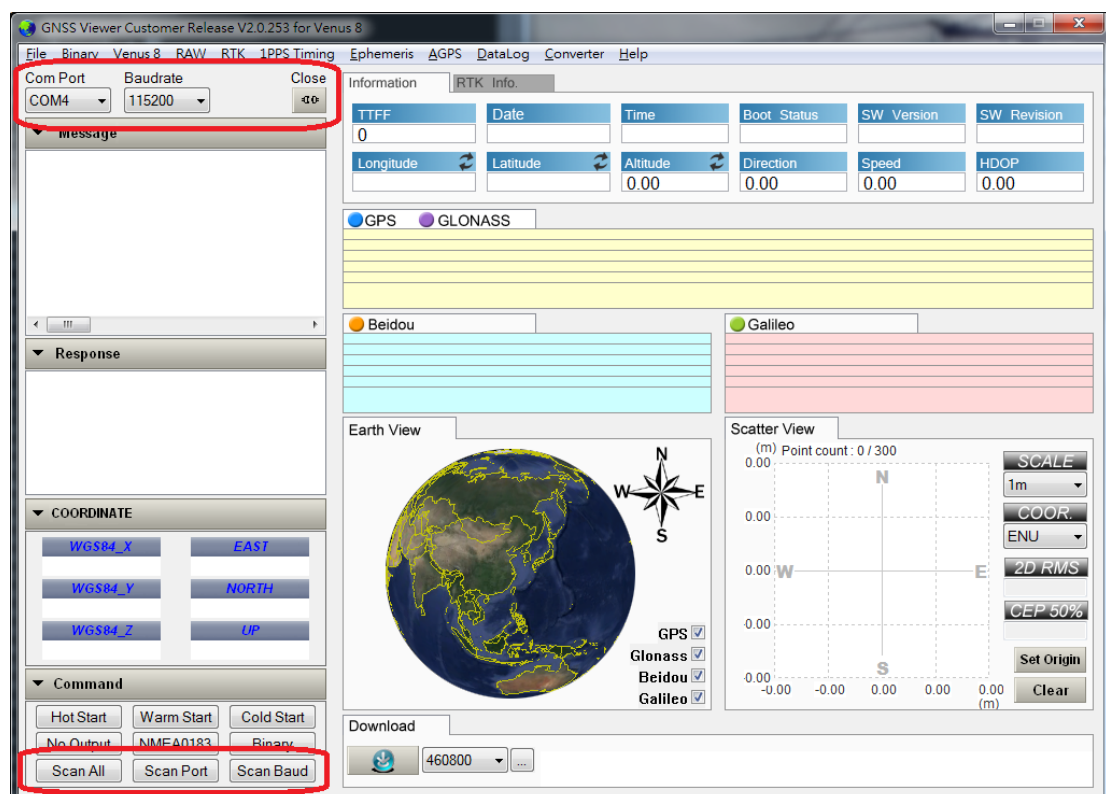





2. Make sure antenna port of the GNSS device has a clear view sky signal.
Now you can start using the GNSS device.

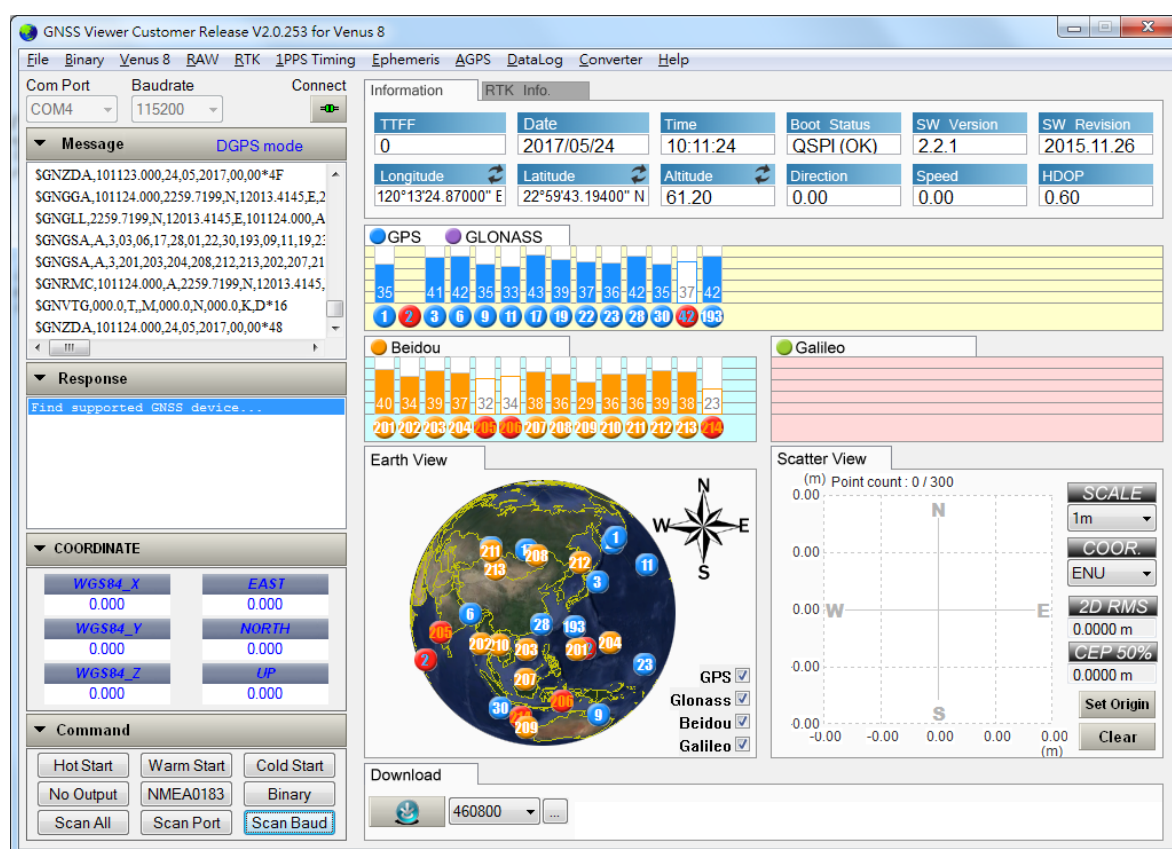
● Start using GNSS viewer

Start “GNSS_Viewer-CustomerRelease -2.0.253.exe” application, which you can find in “GNSS_Viewer” file. Select COM Port and Baud Rate to operate









1. COM Port and Baud Rate can be selected by clicking the pull-down menu, then click on  button.
2. If unsure of the COM Port and Baud Rate for the GNSS device, then select “Scan All”
3. If COM Port is known, but unsure of the correct Baud Rate, then select “Scan Baud”
4. If Baud Rate is known, but unsure of the correct COM Port, then select “Scan Port”

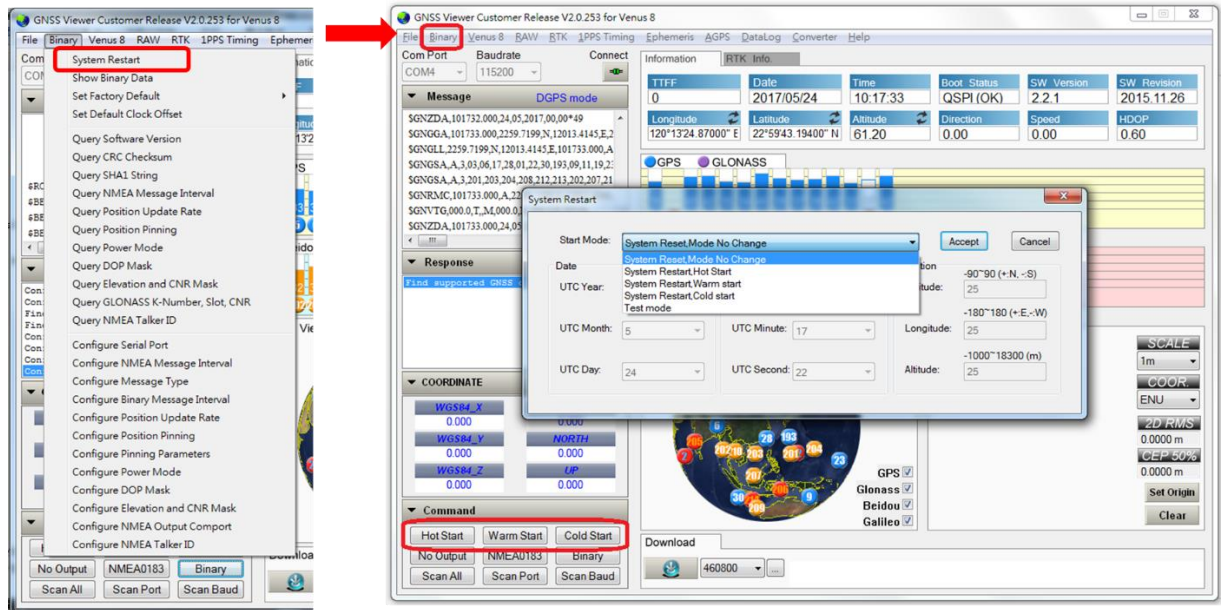
If the connect is succeed, the viewer will show as the figure below:



,which

Satellite Color	Meaning
 Solid blue bar	GPS signal used for position fix
 Empty blue bar	GPS signal tracked but not used for position fix
 Solid orange bar	Beidou signal used for position fix
 Empty orange bar	Beidou signal tracked but not used for position fix
 Solid purple bar	GLONASS signal used for position fix
 Empty purple bar	GLONASS signal tracked but not used for position fix

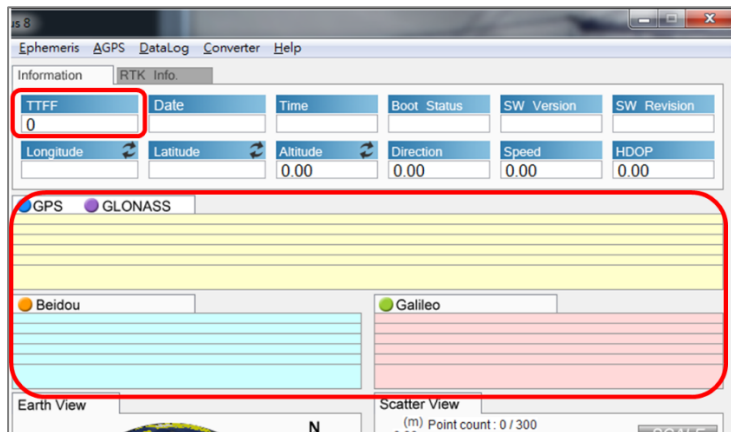
● Hot/Warm/Cold Start



Select start mode by:

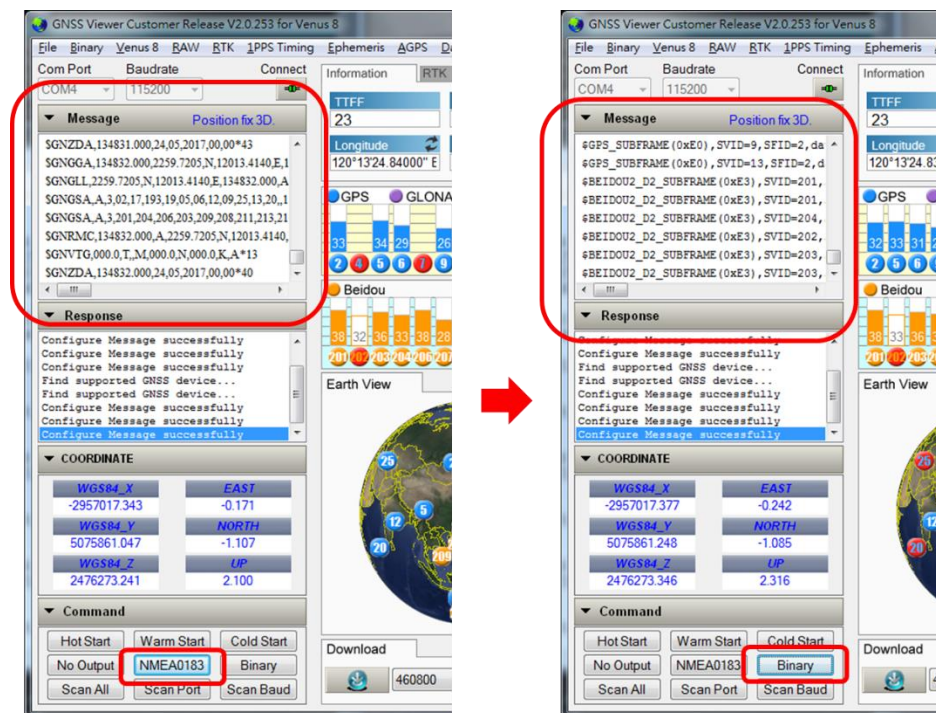
1. Binary → System Restart → click the pull-down menu of the Start Mode → select any start mode you prefer → Accept
- or
2. Clicking the Hot Start / Warm Start / Cold Start button in the command block.

Satellites and signal bars will be cleaned, and TTFF(Time-to-First-Fix) start to count from zero.

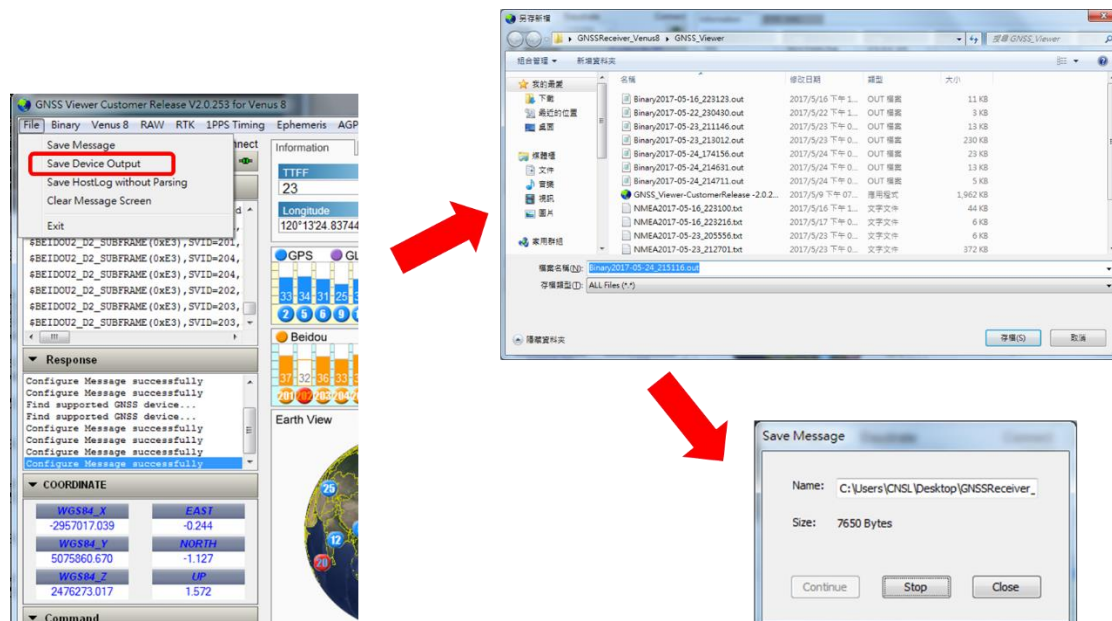


- **Save Binary message**

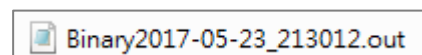
Click the Binary button in the command block to change the message into binary mode.



Next click File → Save Device Output → choose the save path to the “GNSS_Viewer” file. Then it will start saving binary data into the save path until clicking stop and close.

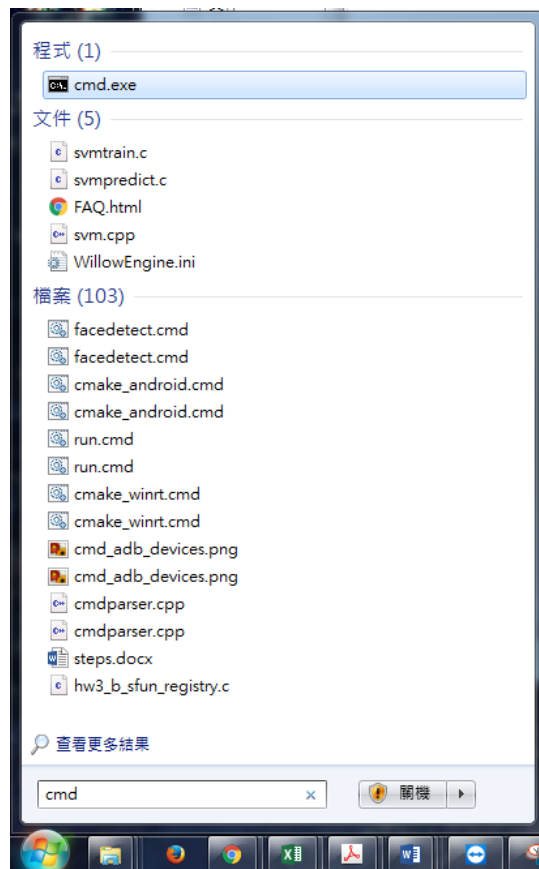


Receiving a (.out) file which is binary type.



- **Read Binary file**

1. First check do you have “convert_skytraq_raw.exe” in “GNSS_Viewer” file.
2. Open “cmd.exe”



3. Use the command “cd path” to set the path to the file where “convert_skytraq_raw.exe” is.
(Example >> cd C:\Users\CNSL\Desktop\GNSSReceiver_Venus8\course_use\GPS receiver_course use\GNSS_Viewer)
 4. Enter command: convert_skytraq_raw.exe help
 5. Enter command: convert_skytraq_raw.exe Binary20XX-XX-XX_XXXXXX.out G
(Example >> convert_skytraq_raw.exe Binary2017-05-23_213012.out G)
- (step3 ~ 5 is shown in the figure below)

```
C:\Windows\system32\cmd.exe
Microsoft Windows [版本 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\CNSL>cd C:\Users\CNSL\Desktop\GNSSReceiver_Venus8\raw_converter\raw_converter
3
C:\Users\CNSL\Desktop\GNSSReceiver_Venus8\raw_converter\raw_converter>convert_sk
ytraq_raw.exe help
4
Usage: host <file_path> <options>

options:
    help - Show this help message.
    A - output all GNSS type.
    G - output GPS.
    R - output GLONASS.
    C - output BeiDou.
    J - output QZSS.
    S - output SBAS. <not support nav yet>
    -dual_freq - output dual frequency observation. <BeiDou B2I only>

C:\Users\CNSL\Desktop\GNSSReceiver_Venus8\raw_converter\raw_converter>convert_sk
ytraq_raw.exe Binary2017-05-23_213012.out G
5

Output GNSS type include:
GPS

Raw file parsing results:
total header number = 2386
succeed             = 2386
cks_error           = 0
tail_mismatch       = 0

Msg cnt: 0xdc=175 0xdd=174 0xde=174 0xdf=174 0xe0=348 0xe1=0 0xe2=223 0xe3=1118
0xe4=0 0xe5=0

C:\Users\CNSL\Desktop\GNSSReceiver_Venus8\raw_converter\raw_converter>
```

6. Then you can receive 2 output files, which are the navigation file and observation file.

 Binary2017-05-23_213012.nav	2017/5/24 下午 1...	NAV 檔案
 Binary2017-05-23_213012.obs	2017/5/24 下午 1...	OBS 檔案
 Binary2017-05-23_213012.out	2017/5/23 下午 0...	OUT 檔案

Open the files and can see the information as following:

.nav = Ephemeris data

```

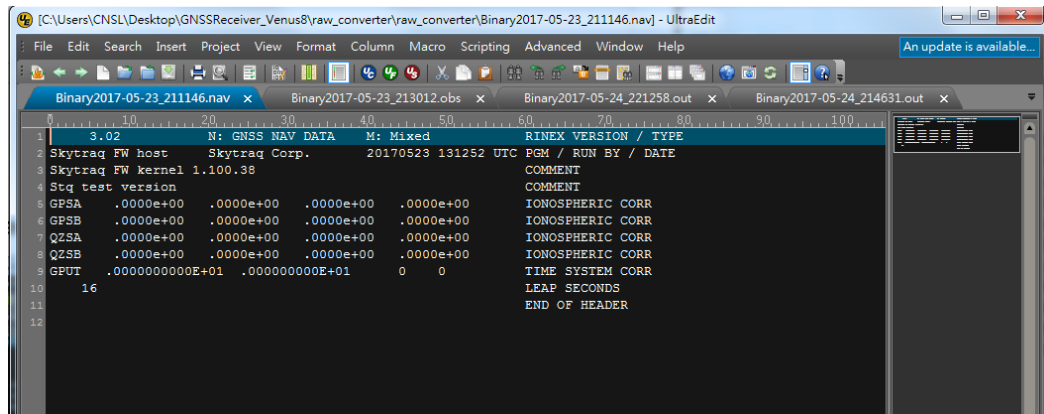
1 3.02 No GNSS NAV DATA G: GPS RINEX VERSION / TYPE
2 Skytraq Corp. 20170524 144500 UTC PGM / RUN BY / DATE
3 Skytraq FW kernel 1.100.98 COMMENT
4 Seq test version COMMENT
5 GPSA .0000e+00 .0000e+00 .0000e+00 .0000e+00 IONOSPHERIC CORR
6 GPSB .0000e+00 .0000e+00 .0000e+00 .0000e+00 IONOSPHERIC CORR
7 GPUT .0000000000E+01 .0000000000E+01 0 0 TIME SYSTEM CORR
8 16 LEAP SECONDS
9 END OF HEADER
10 G02 2017 5 23 14 0 0 4.137838259339e-04 -7.844391802792e-12 0.0000000000e+00
11 6.7000000000e+01 4.7375000000e+01 4.951634826894e-09 -2.632130579604e+00
12 2.490356564522e-06 1.679143984802e-02 5.882233361271e-06 5.153787023544e+03
13 2.2320000000e+05 1.855777406492e-07 -2.444707893611e-02 -7.076031567077e-08
14 9.463106276937e-01 2.874002500000e+02 -1.97988835602e+00 -8.089880253833e-09
15 5.893102614235e-10 1.0000000000e+00 1.9500000000e+03 0.0000000000e+00
16 2.4000000000e+00 0.0000000000e+00 -2.04890966415e-08 6.7000000000e+01
17 2.2146600000e+05 4.0000000000e+00
18 G06 2017 5 23 14 0 0 3.546969965100e-04 5.002220859751e-12 0.0000000000e+00
19 8.1000000000e+01 3.8843750000e+01 4.609477717534e-09 -2.851707461817e+00
20 2.030283212662e-06 7.968610152602e-04 6.143003702164e-06 5.153672027588e+03
21 2.2320000000e+05 1.303851604462e-08 -2.399790143841e+00 -3.725290298462e-09
22 9.671239684352e-01 2.665937500000e+02 -1.105365150918e+00 -8.174269062545e-09
23 4.778770483543e-10 1.0000000000e+00 1.9500000000e+03 0.0000000000e+00
24 2.4000000000e+00 0.0000000000e+00 4.656612873077e-09 8.1000000000e+01
25 2.2146600000e+05 4.0000000000e+00
26 G05 2017 5 23 14 0 0 -4.470348388154e-05 1.705302565824e-12 0.0000000000e+00
27 3.0000000000e+00 -5.3906280000e+01 5.040208844975e-09 1.781330021800e-03
28 -2.698972821236e-06 4.957517609000e-03 6.817281246185e-06 5.15374713089e+03
29 2.2320000000e+05 1.862645149231e-09 -1.365529260118e+00 5.774199962616e-08
30 9.463719546820e-01 2.401562500000e+02 5.366436302527e-01 -8.447851886940e-09
31 -3.914448766789e-10 1.0000000000e+00 1.9500000000e+03 0.0000000000e+00
32 2.4000000000e+00 0.0000000000e+00 -1.071020960808e-08 3.0000000000e+00
33 2.2146600000e+05 4.0000000000e+00
34 G09 2017 5 23 13 59 44 3.692996688187e-04 7.958078640513e-12 0.0000000000e+00
  
```

.obs = Receiver data

```

1 3.02 OBSERVATION DATA G: GPS RINEX VERSION / TYPE
2 convert_skytraq_raw Skytraq Corp. 20170524 144500 UTC PGM / RUN BY / DATE
3 Test version 0.1 COMMENT
4 MARKER NAME
5 MARKER NUMBER
6 MARKER TYPE
7 Skytraq Corp. OBSERVER / AGENCY
8 REC # / TYPE / VERS
9 ANT # / TYPE
10 APPROX POSITION XYZ
11 ANTENNA: DELTA H/E/N
12 SYS / # / OBS TYPES
13 TIME OF FIRST OBS
14 TIME OF LAST OBS
15 END OF HEADER
16 > 2017 5 23 13 30 48.6359999 0 11
17 G 2 213106407.643 -4817572.696 1945.518 43.000
18 G 5 212328850.275 -6345579.661 1957.866 47.000
19 G 6 212381395.070 -859529.731 240.812 45.000
20 G 9 213489382.002 1181097.639 -1190.311 43.000
21 G12 213673694.072 -1777021.843 -28.412 44.000
22 G13 215628620.170 -5235769.336 4035.552 37.000
23 G17 212889728.918 3316496.919 -1910.415 46.000
24 G19 212002621.784 1265391.007 -1150.309 45.000
25 G20 216214497.131 -1331670.512 3240.016 35.000
26 G23 216532121.667 4323976.254 -2119.574 38.000
27 G25 216040484.083 -244303.777 1763.159 36.000
28 > 2017 5 23 13 30 49.6359999 0 11
29 G 2 213106036.356 -4819523.637 1960.153 43.000
30 G 5 212328477.904 -6347536.345 1959.147 47.000
31 G 6 212381349.492 -859769.400 241.726 45.000
32 G 9 213489608.620 1182288.545 -1191.897 43.000
33 G12 213673700.616 -1776989.810 -34.845 43.000
34 G13 215627850.912 -5239810.650 4043.784 37.000
  
```

If the information of the navigation file is shown as the figure below, this means that the data receiving time is not long enough. The database are too short to decode. Please repeat the Save Binary Message step and try again Read Binary File step.

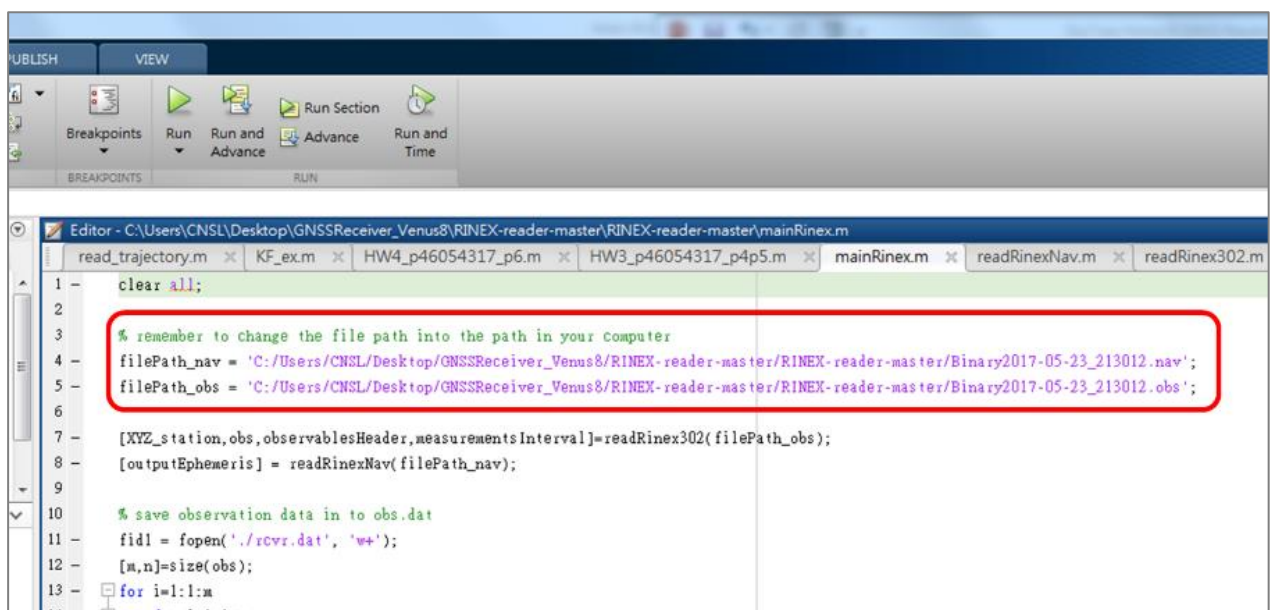


- **Get ephemeris data and receiver data in MATLAB**

(The MATLAB code in RINEX-reader file is download from

<https://github.com/manromao/RINEX-reader> in order to read the data which is save as RINEX 3.02 version.)

1. Open “mainRinex.m” MATLAB code which you can find in “RINEX-reader” file.
2. Remember to change the filepath_nav and filepath_obs into the file path in your computer.



3. Run mainRinex.m, and you will get eph.dat and rcvr.dat in Document\Matlab file.

	eph.dat	2017/6/1 下午 03...	DAT - MPEG 視訊...	4 KB
	rcvr.dat	2017/6/1 下午 03...	DAT - MPEG 視訊...	143 KB