

AIW FAQ

AIW-210 GNSS simple function test on Linux OS			
Category	AIW	Date	2026/4/28
Keyword	AIW-210, GNSS function test		
HW model	ARK-1251		
OS version	Ubuntu 24.04.2, Linux kernel version: 6.17.0-22-generic		

Category

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1. Background & environment requirements

This document is intended for anyone who needs to verify the AIW-210 GNSS functionality, including tasks such as:

- Verifying if the GNSS receiver can obtain a 3D position fix
- Performing RF function verification
- Conducting production tests

Test Environment Requirements: The following test steps should be performed in an environment with good GNSS signal reception. The GNSS antenna must be placed in an area with a clear, open-sky view, such as on a balcony or outdoors.

2. Testing steps

Step 1:

Verify that the AIW-210 USB interface is properly connected to the host using the "lsusb" command. You should also see a corresponding USB device node, such as "/dev/ttyACMx".

```
ark-1221@ADV:~$ lsusb
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 002: ID 046d:c548 Logitech, Inc. Logi Bolt Receiver
Bus 001 Device 003: ID 1546:01a9 U-Blox AG u-blox GNSS receiver
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
ark-1221@ADV:~$ ls /dev/ttyACM0
/dev/ttyACM0
```

Step 2:

Execute the "cat" command to verify that the module outputs NMEA messages correctly.

```
ark-1221@ADV:~$ sudo cat /dev/ttyACM0
[sudo] password for ark-1221:
$GNRMC,,V,,,,,,,,,N,V*37

$GNVTG,,,,,,,,N*2E

$GNGGA,,,,,0,00,99.99,,,,,*56

$GNGSA,A,1,,,,,,,,,99.99,99.99,99.99,1*33
$GNGSA,A,1,,,,,,,,,99.99,99.99,99.99,2*30
$GNGSA,A,1,,,,,,,,,99.99,99.99,99.99,3*31
$GNGSA,A,1,,,,,,,,,99.99,99.99,99.99,4*36

$GPGSV,1,1,00,1*64
$GLGSV,1,1,00,1*78
$GAGSV,1,1,00,7*73
$GBGSV,1,1,00,1*76
$GNLL,,,,,V,N*7A
$GNRMC,,V,,,,,,,,,N,V*37
$GNVTG,,,,,,,,N*2E
$GNGGA,,,,,0,00,99.99,,,,,*56
$GNGSA,A,1,,,,,,,,,99.99,99.99,99.99,1*33
$GNGSA,A,1,,,,,,,,,99.99,99.99,99.99,2*30
$GNGSA,A,1,,,,,,,,,99.99,99.99,99.99,3*31
$GNGSA,A,1,,,,,,,,,99.99,99.99,99.99,4*36
```

Step 3:

Install the "gpsd" service. The "gpsd" daemon monitors GNSS receivers via serial or USB ports in Linux.

```
ark-1221@ADV:~$  
ark-1221@ADV:~$ sudo apt install gpsd gpsd-clients  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
The following additional packages will be installed:  
  blt fonts-lyx gpsd-tools isympy-common isympy3 javascript-common libblas3 libgfortran5 libgps30t64 libjs-jquery libjs-jquery-ui liblapack3 liblbfgsb0 libqhull-r8.0 libtk8.6  
  python-matplotlib-data python3-appdirs python3-brotli python3-bs4 python3-contourpy python3-cssselect python3-cycler python3-decorator python3-fonttools python3-fs python3-gi-cairo  
  python3-gps python3-html5lib python3-lxml python3-lz4 python3-matplotlib python3-mpmath python3-numpy python3-packaging python3-pil.imagetk python3-scipy  
  python3-soupsieve python3-sympy python3-tk python3-ufolib2 python3-unicodedata2 python3-webencodings tk8.6-blt2.5 unicode-data  
Suggested packages:  
  blt-demo apache2 | lighttpd | httpd libjs-jquery-ui-docs tk8.6 python-cycler-doc python3-genshi python-lxml-doc cn-super-minimal dvipng ffmpeg fonts-staypuft inkscape ipython3  
  python3-cairocffi python3-gobject python3-pyqt5 python3-sip python3-tornado texlive-extra-utils texlive-latex-extra python-mpmath-doc python3-gmpy2 gfortran python3-dev  
  python3-pytest python-pil-doc python-scipy-doc texlive-fonts-extra python-sympy-doc tix python3-tk-dbg  
The following NEW packages will be installed:  
  blt fonts-lyx gpsd gpsd-clients gpsd-tools isympy-common isympy3 javascript-common libblas3 libgfortran5 libgps30t64 libjs-jquery libjs-jquery-ui liblapack3 liblbfgsb0  
  libqhull-r8.0 libtk8.6 python-matplotlib-data python3-appdirs python3-brotli python3-bs4 python3-contourpy python3-cssselect python3-cycler python3-decorator python3-fonttools  
  python3-gi-cairo python3-gps python3-html5lib python3-kiwisolver python3-lxml python3-lz4 python3-matplotlib python3-mpmath python3-numpy python3-packaging  
  python3-pil.imagetk python3-scipy python3-soupsieve python3-sympy python3-tk python3-ufolib2 python3-unicodedata2 python3-webencodings tk8.6-blt2.5 unicode-data  
0 upgraded, 47 newly installed, 0 to remove and 232 not upgraded.  
Need to get 54.2 MB of archives.  
After this operation, 229 MB of additional disk space will be used.  
Do you want to continue? [Y/n] y
```

Step 4:

Configure the GNSS receiver's USB port for the gpsd daemon.

```
# gpsd /dev/ttyACM0
```

Step 5:

Use the "cgps" command to obtain UTC, latitude, longitude, and speed information, as shown below:

```
Time 2026-04-28T08:12:54.000Z (18)  Seen 22/Used 7  
Latitude 25.05781670 N GP 5 5 50.0 316.0 33.0 Y  
Longitude 121.38587660 E GP 12 12 10.0 231.0 26.0 Y  
Alt (HAE, MSL) 168.159, 113.386 ft GP 15 15 30.0 219.0 28.0 Y  
Speed 8.33 mph GP 29 29 24.0 315.0 24.0 Y  
Track (true, var) 267.0, -4.6 deg GL 5 60 44.0 228.0 34.0 Y  
Climb -15.16 ft/min GA 27 327 13.0 277.0 35.0 Y  
Status 3D DGPS FIX (12 secs) BD 2 402 36.0 245.0 35.0 Y  
Long Err (XDOF, EPX) 3.97, +/- 48.8 ft GP 11 11 59.0 60.0 9.0 N  
Lat Err (YDOF, EPY) 0.77, +/- 9.5 ft GP 20 20 56.0 203.0 23.0 N  
Alt Err (XDOF, EPU) 3.12, +/- 92.8 ft GP 25 25 n/a 0.0 20.0 N  
2D Err (HDOF, CEP) 4.00, +/- 143 ft GP 30 30 20.0 96.0 0.0 N  
3D Err (PDOP, SEP) 5.14, +/- 79.5 ft SB127 40 12.0 258.0 33.0 N  
Time Err (TDOP) 4.00 SB128 41 38.0 242.0 33.0 N  
Geo Err (GDOP) 6.51 SB129 42 51.0 134.0 0.0 N  
Speed Err (EPS) +/- 66.5 mph GL 3 67 25.0 25.0 0.0 N  
Track Err (EPD) n/a GL 4 68 73.0 342.0 0.0 N  
Time offset 0.041613100 s GL 17 81 11.0 134.0 0.0 N  
Grid Square PL09qbg3 GL 19 83 54.0 356.0 0.0 N  
ECEF X, YX -9078356.506 ft 0.262 ft/s GL 20 84 7.0 327.0 25.0 N  
ECEF Y, VY 16192319.841 ft 0.295 ft/s BD 26 426 n/a 0.0 0.0 N  
ECEF Z, VZ 8808724.772 ft -0.295 ft/s BD 27 427 n/a 0.0 0.0 N  
More...  
{ "PRN":22,"qual":7,"ss":34.0,"used":true,"health":1},{ "PRN":81,"gnssid":6,"svId":17,"az":134.0,"el":11.0,"prRes":13.4,"qual":1,"ss":0.0,"used":false,"health":1},{ "PRN":82,"gnssid":6,"svId":18,"az":107.0,"el":53.0,"prRes":10.7,"qual":0,"ss":0.0,"used":false,"health":1},{ "PRN":83,"gnssid":6,"svId":19,"az":135.0,"el":54.0,"prRes":35.6,"qual":1,"ss":0.0,"used":false,"health":1},{ "PRN":84,"gnssid":6,"svId":20,"az":327.0,"el":7.0,"prRes":32.7,"qual":3,"ss":25.0,"used":false,"health":1}}  
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{"class":"TPV","device":"/dev/ttyACM0","status":2,"mode":3,"time":"2026-04-28T08:12:54.000Z","leapseconds":18,"ept":0.005,"lat":25.057816700,"lon":121.385876600,"altHAE":51.2550,"altMSL":34.5600,"alt":34.5600,"epx":14.871,"epy":2.900,"epv":28.270,"track":267.0070,"magtrack":262.4066,"magvar":-4.6,"speed":0.149,"climb":-0.077,"eps":29.74,"epc":56.55,"ecefX":-3010923.
```

Step 6:

Run the "gpsmon" command to monitor packets coming from the GPS and display them along with diagnostic information.

```
tcp://localhost:2947 NMEA0183> or":15]
Time: 2026-04-28T08:10:21.000Z Lat: 25 03.461000' N Lon: 121 23.232400' E Ver": "u_blox", "subtype": "SW EXT CORE 4.04 (7f89f7).HM 0x109000", "subtype1": "ROM BASE 0x118B2060, FWVER=SP
Cooked TPV 28T08:10:00.025Z", "flags": 1, "native": 1, "bps": 9600, "parity": "N", "stopbits": 1, "cycle": 1.00, "mincycle": 0.0
GPZDA GPGGA GPRMC GPCSA GPGSV
Sentences
SVID PRN Az El SN HU Time: 081021.00 Time: 081021.00
GP 5 5 314 50 34 Y Latitude: 2503.4610 N Latitude: 2503.4610
GP 5 5 314 50 34 Y Longitude: 12123.2324 E Longitude: 12123.2324
GP 12 12 232 11 28 Y Speed: 0.0914 Altitude: 2.45
GP 12 12 232 11 28 Y Course: 267.007 Quality: 2 Sats: 04
GP 29 29 316 23 28 Y Status: A FAA: HDOP:
GP 29 29 316 23 28 Y MagVar: -4.6 W Geoid: 18.94
GP 7 7 63 8 0 N RMC GGA
GP 7 7 63 8 0 N
GP 11 11 57 59 0 N Mode: A3 Sats: 5 5 12 + UTC: RMS:
GP 11 11 57 59 0 N DOP H= V= P= MAJ: MIN:
GP 15 15 219 29 17 N TOFF: 0.031652148 ORI: LAT:
GP 15 15 219 29 17 N PPS: N/A LON: ALT:
V GSV GSA + PPS GST
(70) GPGSV,4,1,15,05,50,314,34,07,08,063,00,11,59,057,00,12,11,232,29*76
(70) GPGSV,4,2,15,15,29,219,17,29,23,316,27,30,20,097,00,40,12,258,00*74
(70) GPGSV,4,3,15,41,38,242,33,42,51,134,00,67,27,025,00,68,74,338,00*71
(57) GPGSV,4,4,15,02,53,105,00,83,53,355,00,84,07,327,22*46
(38) GPZDA,081020.00,28,04,2026,00,00*65
(70) GPGGA,081020.00,2503.4609,N,12123.2321,E,2,04,,2.45,M,18.943,M,,*74
(77) GPRMC,081020.00,A,2503.4609,N,12123.2321,E,0.1030,267.007,280426,-4.6,M*5C
(35) GPGSA,A,3,5,12,29,,,,,,,,,,,,*21
(70) GPGSV,5,1,17,05,50,314,34,07,08,063,00,11,59,057,00,12,11,232,28*74
(70) GPGSV,5,2,17,15,29,219,17,29,23,316,28,30,20,097,00,40,12,258,00*78
(70) GPGSV,5,3,17,41,38,242,33,42,51,134,00,67,27,025,00,68,74,338,00*71
(70) GPGSV,5,4,17,69,43,226,37,81,12,133,00,82,53,105,00,83,53,355,00*79
(31) GPGSV,5,5,17,04,07,327,22*42
(70) GPGSV,5,1,17,05,50,314,34,07,08,063,00,11,59,057,00,12,11,232,28*74
(70) GPGSV,5,2,17,15,29,219,17,29,23,316,28,30,20,097,00,40,12,258,00*78
(70) GPGSV,5,3,17,41,38,242,33,42,51,134,00,67,27,025,00,68,74,338,00*71
(70) GPGSV,5,4,17,69,43,226,37,81,12,133,00,82,53,105,00,83,53,355,00*79
(31) GPGSV,5,5,17,04,07,327,22*42
(38) GPZDA,081021.00,28,04,2026,00,00*64
(70) GPGGA,081021.00,2503.4610,N,12123.2324,E,2,04,,2.45,M,18.943,M,,*78
(77) GPRMC,081021.00,A,2503.4610,N,12123.2324,E,0.0914,267.007,280426,-4.6,M*5E
(35) GPGSA,A,3,5,12,29,,,,,,,,,,,,*21
```