

Introduction to GNSS Positioning Modules

Neoway Technology Co., Ltd.

Feb 2024

Product linecard

Model	Size			GNSS							Accuracy			Features							Port	Grade	
	10.1*9.7*2.5mm	12.2*16.0*2.4mm	26.7*18.5*7.0mm	Bands (S/D/T)	GPS	BDS	GLONASS	Galileo	QZSS	IRNSS	Meter	Sub-meter	Centimeter	Built-in LNA	Data logging	Programmable	D-GNSS	Oscillator	Raw data	RTK rover	UART	Industrial	Automotive
GN01-A1			•	D	•	•	○	•	•	•	•			•	•	Flash	•	T			•	•	
GN02-A1		•		D	•	•		•	•	•		•		•	•	Flash	•	T			•	•	
GN03-A1	•			D	•	•		•	•	•		•		•	•	Flash	•	T			•	•	
GN05/06-A1	•			S	•	•			•		•			•	•	Flash	•	T			•	•	
GN07-A1		•		D	•	•		•	○				•		•	Flash	•	T	•	•	•	•	
GN08-A1		•		D	•	•		•	○			•			•	Flash	•	T	•	•	•	•	
GN09-A1		•		S	•	•		○	•		•			•	•	Flash	•	T			•	•	

T=TCXO

○=Supported upon request with special FW

Single-frequency standard precision module

About GN06



Package compatibility

- Has two standard package sizes of 12.2 mm x 16.0 mm and 10.1 mm x 9.7 mm.
- Compatible with mainstream GPS modules and can save replacement costs.
- An SMD component that facilitates mass production.

Product characteristics

- Supports BDS B1I, B1C / GPS L1C/A
- Ultra-low power consumption
- Supports independent positioning with a single system and joint positioning with multiple systems.
- Supports A-GNSS assisted positioning.
- Supports active antenna detection and protection.

Applicable scenarios:



Vehicle Navigation



Internet of Vehicles (IoV)



Logistics Tracking



Vehicle Monitoring

		GN05-A1	GN06-A1
GNSS接收		GPS/QZSS: L1C/A	GPS/QZSS: L1C/A
		BDS: B1I,B1C	BDS: B1I,B1C
GNSS通道		88	88
更新率		1Hz	1Hz
定位精度	GNSS	1.5m CEP	1.5m CEP
速度精度	GNSS	0.1m/s CEP	0.1m/s CEP
时间精度	1PPS	20ns	20ns
TTFF	热启动	1s	1s
	冷启动	28s	28s
灵敏度	冷启动	-148dBm	-148dBm
	热启动	-156dBm	-156dBm
	追踪 & 导航	-163dBm	-163dBm
电源电压		2.0V~3.6V	2.0V~3.6V
功耗@3.3V	运行	16mA	16mA
	待机	15uA	15uA
工作温度		-40°C~+85°C	-40°C~+85°C
封装		12.2*16.0*2.4mm	10.1*9.7*2.5mm



Dual-frequency standard precision module

About GN02/GN03



Package compatibility

- Has two standard package sizes of 12.2 mm x 16.0 mm and 10.1 mm x 9.7 mm.
- Compatible with mainstream GPS modules and can save replacement costs.
- An SMD component that facilitates mass production.

Product characteristics

- Supports L1+L5 dual bands
- Supports GPS, BDS, GLONASS, Galileo, IRNSS, and QZSS
- Supports BeiDou-3 satellite system.
- Supports independent positioning with a single system and joint positioning with multiple systems.
- Supports A-GNSS assisted positioning.
- Sub-meter level positioning accuracy

Applicable scenarios:



Vehicle Navigation



Internet of Vehicles (IoV)



Logistics Tracking



Vehicle Monitoring



Vehicle Navigation



		GN02-A1	GN03-A1
GNSS Reception		GPS/QZSS: L1C/A, L5C	GPS/QZSS: L1C/A, L5C
		BDS: B1I, B1C, B2a	BDS: B1I, B1C, B2a
		GLONASS: G1	GLONASS: G1
		Galileo: E1, E5a	Galileo: E1, E5a
		IRNSS: L5	IRNSS: L5
GNSS channels		136	136
Update rate		1 Hz	1 Hz
Positioning accuracy	GNSS	1.0 m CEP	1.0 m CEP
Speed accuracy	GNSS	0.1 m/s CEP	0.1 m/s CEP
Time accuracy	1PPS	20 ns	20 ns
TTFF	Hot start	1s	1s
	Cold start	32s	24s
Sensitivity	Cold start	-148 dBm	-148 dBm
	Tracking & navigation	-162 dBm	-161 dBm
Power voltage		2.0 V to 3.6 V	2.0 V to 3.6 V
Power consumption @ 3.3 V	Operating	41 mA@dual bands, 22 mA@single band	41 mA@dual bands, 22 mA@single band
	Standby	12 uA	12 uA
Package		12.2 x 16.0 x 2.4mm	10.1 x 9.7 x 2.5mm



Inertial navigation module

About GN09



Package compatibility

- Has a standard package size of 12.2 mm x 16.0 mm.
- Compatible with mainstream GPS modules and can save replacement costs.
- An SMD component that facilitates mass production.

Product characteristics

- Supports L1+L5 dual bands
- Supports BeiDou-3 satellite system.
- The module has a built-in 6D IMU, with support for 3-axis accelerometer and 3-axis gyroscope.
- It also supports other sensor inputs for multi-source fusion.
- Free Installation
- Features both ADR and UDR dual modes, allowing for free switching between the two modes.

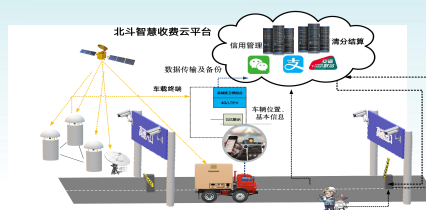
Applicable scenarios:



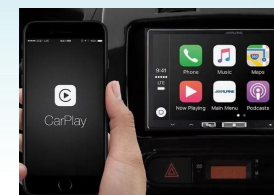
Vehicle Navigation



Smart Cockpit



Mileage-based Fees



Vehicle Networking



T-BOX

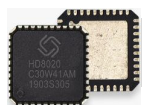


		GN09-A1	GN09-A2
GNSS Reception		GPS/QZSS: L1, L5	GPS/QZSS: L1
		BDS: B1I, B1C, B2a	BDS: B1I, B1C
GNSS channels		136	136
Location update rate		1 Hz	1 Hz
Sensor output rate		50 Hz	50 Hz
Positioning accuracy	GNSS	1.0 m (CEP)	1.0 m (CEP)
Speed accuracy	GNSS	0.1 m/s CEP	0.1 m/s CEP
Positioning error	UDR	≤ 5% of the traveled distance	≤ 5% of the traveled distance
	ADR	≤ 3% of the traveled distance	≤ 3% of the traveled distance
Time accuracy	1PPS	20 ns	20 ns
TTFF	Hot start	1s	1s
	Cold start	30s	30s
Sensitivity	Cold start	-148 dBm	-148 dBm
	Tracking & navigation	-160 dBm	-160 dBm
Power voltage		3.0 V to 3.6 V	3.0 V to 3.6 V
Power consumption @ 3.3 V	Operating	50 mA	38 mA
	Standby	12 uA	12 uA
Operating temperature		-40℃ to +85℃	-40℃ to +85℃
Grade		Industrial	Industrial



High-precision module

About GN07/GN08



Allystar Cynosure III



Package compatibility

- Has a standard package size of 12.2 mm x 16.0 mm.
- Compatible with mainstream GPS modules, and can save replacement costs.
- An SMD component that facilitates mass production.

Product characteristics

- Supports L1+L2 or L1+L5 dual bands
- Supports GPS, BDS, GLONASS, Galileo, and QZSS
- Supports BeiDou-3 satellite system.
- Supports RTK real-time dynamic technology
- Centimeter-level positioning accuracy
- Can output both raw observation data and RTK solution results simultaneously.

Applicable scenarios:



Surveying and Mapping



Geospatial Monitoring



Unmanned Aerial Vehicle (UAV)



Smart Agriculture



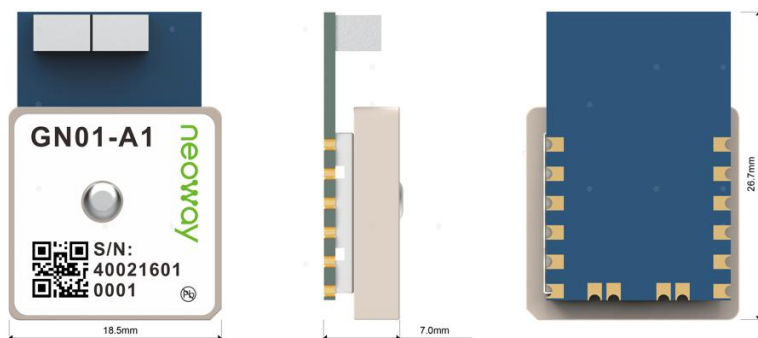
Intelligent Driving



		GN08-A1	GN07-A1
GNSS Reception		GPS/QZSS: L1C/A, L2C, L5	GPS/QZSS: L1C/A, L2C, L5
		BDS: B1I, B2I, B2a	BDS: B1I, B2I, B2a
		GLONASS: G1, G2	GLONASS: G1, G2
		Galileo: E1, E5a	Galileo: E1, E5a
GNSS channels		136	136
Update rate		1 Hz, 5 Hz	1 Hz, 5 Hz
Positioning accuracy	GNSS	1.0 m (CEP)	1.0 m (CEP)
	DGNSS	-	< 1.0 m (CEP)
	RTK	-	1.0 cm + 1 ppm (H) 3.0 cm + 1 ppm (V)
Speed accuracy	GNSS	0.1 m/s CEP	0.1 m/s CEP
Time accuracy	1PPS	20 ns	20 ns
TTFF	Hot start	1s	2s
	Cold start	24s	24s
	RTK convergence time	-	< 10s
Sensitivity	Cold start	-148 dBm	-148 dBm
	Tracking & navigation	-160 dBm	-162 dBm
Power voltage		2.0 V to 3.6 V	2.0 V to 3.6 V
Power consumption @ 3.3 V	Operating	34 mA	34 mA
	Standby	12 uA	12 uA
Operating temperature		-40°C to +85°C	-40°C to +85°C



Gmouse



Product characteristics

- Supports L1+L5 dual bands
- Supports GPS, BDS, GLONASS, Galileo, and QZSS
- Supports AGPS, DGPS, and SBAS (WAAS, EGNOS, MSAS, GAGAN)
- Built-in LNA&SAW
- Built-in dual-band (L1+L5) antenna
- Supports Geo-fence function
- Supports automatic switching of external active antennas.
- Comes in a LCC package and features dimensions of 26.7 mm x 18.5 mm x 7.0 mm.

Applicable scenarios:



Vehicle Navigation



Logistics Tracking



Unmanned
Aerial
Vehicle (UAV)



Two-Wheeler



GN01-A1		
GNSS Reception		GPS/QZSS: L1C/A, L5
		BDS: B1I, B2a
		GLONASS: G1
		Galileo: E1, E5a
		INRSS: L5
GNSS channels		136
Update rate		1 Hz
Positioning accuracy	GNSS	1.0 m CEP@Open Sky
Speed accuracy	GNSS	0.1 m/s CEP
Time accuracy	1PPS	20 ns
TTFF	Hot start	1s
	Cold start	30s
Sensitivity	Cold start	-149 dBm
	Tracking & navigation	-162 dBm
Power voltage		3.1 V to 5.0 V
Power consumption @ 3.3 V	Operating	52 mA
	Standby	12 uA
Operating temperature		-40°C to +85°C
Package		26.7 x 18.5 x 7.0 mm

Thank you!