# M20 High-precision Module

GNSS Full Constellation & Frequency High Precision Positioning

Brief Introduction

M20 is based on GNSS technology with completely independent intellectual property rights, the module has 54 pins with package of LGA. The high-precision measurement engine, navigation engine and functional safety engine are integrated in the module, conforming to ASIL B functional safety requirements. High-performance NRTK/PPP/PPP-RTK solution, anti-jamming, anti-deception, L-Band and CLAS SBAS signal reception are supported to deal with harsh environments such as satellite signal interference and outage. The module can provide continuous, real-time and reliable high-precision position and features high integration, high performance, low power consumption, small size, etc. and can be applied to automated driving, advanced driver assistance, lane-level navigation, drones, intelligent robots, precision agriculture, surveying, mapping, etc.
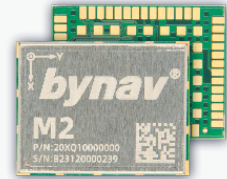
Technological Advantage

Full Constellation & Frequency GNSS Signal Solution

Bynav REAL (Ransac Enhanced Advanced Location) GNSS positioning engine has integrity monitoring to improve the fault tolerance and fixed solution rate under multipath and interference conditions in urban area, it can provide more stable and accurate results.

Anti-jamming GNSS Measurement and Positioning Engine

To meet the expected functional safety and network security requirements, SAIF (Smart Advanced Interference Defense), the high-performance multiple interference suppression technoloy, is built in and capable of handling different interferences such as single-frequency, multitone, sweeping, pulse, narrowband with interference-signal ratio of 65 dBc. Also, high-quantity signal preprocessing and interference suppression technology are adopted to deal with vehicle anti-tracking equipment, radar/airport signal towers, etc., it can greatly improve the availability and integrity of high-precision positioning in vehicle scenarios.

L-Band/CLAS and NRTK/PPP/PPP-RTK

Beidou-3 B2b PPP solution, QZSS CLAS PPP-RTK solution and prevailing PPP-RTK differential service are supported to provide high-precision positioning in environments without conventional differential or mobile communication services. Beidou and Galileo four-frequency signals are used to greatly speed up PPP convergence and improve the availability of high-precision positioning.

Functional Safety ASIL B

The design is based on ISO26262 ASIL B functional safety requirements. With built-in functional safety GNSS SoC Alice and algorithm, high-precision position, velocity and time with system-level functional safety can be provided for intelligent vehicles and autonomous driving.

Feature

» **Independent intellectual property rights**

» **Full constellations and full frequencies (1507 channels)**

» **L-Band/CLAS SBAS**

» **NRTK/PPP/PPP-RTK**

» **Anti-jamming & Anti-deception**

» **AEC-Q104**

» **ISO 26262 ASIL B**

» **Multiple interfaces**

17mm

22mm

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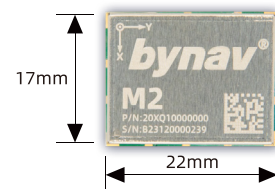
Performance

Constellation
GPS、BDS、GLO、GAL、QZSS、IRNSS

Number of Channel
1507 Channels

Tracking
L-Band*

BDS	B1I、B2I、**B3I**、**B1C***、B2a、**B2b*(PPP)**
GPS	L1 C/A、**L1C***、L2、L5
GLO	G1, G2
GAL	E1、**E5a**、E5b、**E6***
QZSS	L1CA、L1C、L2、L5、**L6(CLAS*)**
NavIC (IRNSS)	L5
SBAS*	L1 C/A

Anti-interference*
Single-frequency, Multitone, Sweeping, Pulse, Narrowband; Interference-Signal Ratio: 65 dBc

Interface
UART	×4
SPI*	×1
CANFD	×2
Wheel tick	×1
ANT_DETECT	×1
GEOFENCE	×1
PPS	×1
FuSa*	×2
EVENT_IO	×5
RMII	×1

Horizontal Positioning Accuracy (RMS)[1]
Single Point	1.5 m
RTK	1.0 cm + 1 ppm

Vertical Positioning Accuracy (RMS)[1]
Single Point	2.5 m
RTK	1.5 cm + 1 ppm

Max Transfer Rate
GNSS Observation	50 Hz[6]
GNSS Position Results	10Hz [7]

Initialization and Timing
Cold Start[2]	≤ 30 s
Hot Start[3]	≤ 5 s
RTK Initialization[1]	≤ 5 s
Re-acquisition Time	≤ 1s
Timing Accuracy (RMS) [4]	≤ 20 ns
Speed Accuracy	0.03m/s
RTK Solution Delay	≤ 50 ms

Accuracy (RMS)	BDS	GPS	GLO	GAL
B1I/B1C/L1C/L1 CA/E1/G1 Pseudo-range	10cm	10cm	10cm	10cm
B1I/B1C/L1C/L1 CA/E1/G1 Carrier Phase	1mm	1mm	1mm	1mm
B2I/B2a/B2b/L5/E5a/E5b Pseudo-range	10cm	10cm	10cm	10cm
B2I/B2a/B2b/L5/E5a/E5b Carrier Phase	1mm	1mm	1mm	1mm
B3I/L2/G2 Pseudo-range	10cm	10cm	10cm	10cm
B3I/L2/G2 Carrier Phase	1mm	1mm	1mm	1mm

Mechanical and Electrical

Model	M20
Size (mm)	17.0×22.0×2.75
Weight (g)	2
Power Consumption (mW)[5]	500

Environment and Certificate

Operating Temperature [8]	-40° C ~ +105℃
Storage Temperature [9]	-55° C ~ +150℃
Humidity	95% Non-condensing

IATF 16949 (Management)*
ISO 26262 ASIL B (Product)*
AEC-Q104*
RoHS
FCC
IC
CE
UKCA
REACH

Note:
1. Typical value.Performance will be affected by GNSS status, satellites' location, baseline length, multipath and other interference;
2. Typical value. There is no almanac, ephemeris and approximate position or time;
3. Typical value. Almanac, ephemeris and approximate position or time are preserved;
4. Optional. Bias caused by RF and antenna is not included;
5. Typical value. Power of antenna and peripherals is not included;
6. When high-speed communication interface is used;
7. 20Hz is supported in special firmware;
8. There are optional temperature range of -40℃~85℃ and -20℃~65℃ ;
9. There are optional temperature range of -40 ℃ ~105 ℃ and -40℃~65℃ .
* Optional or supported in special firmware.

More information, please refer to
www.bynav.com

Wechat Official Account

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