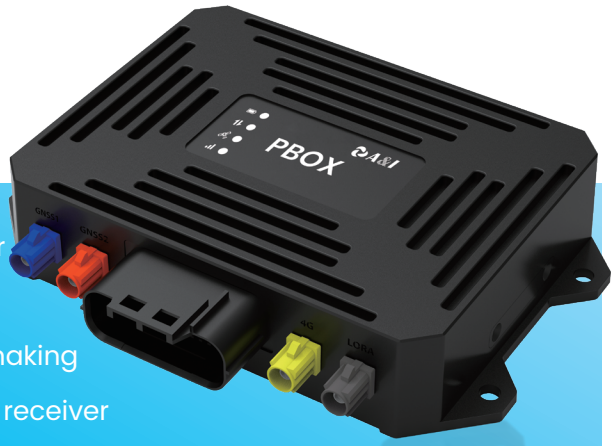
PBOX

Tight Coupling Navigation Receiver



The PBOX is a compact tight coupling navigation receiver independently developed by A&I. This receiver adopts a vehicle-grade chip solution and ruggedized interfaces, making it more suitable for operation in harsh environments. The receiver supports full constellation and full frequency band, and is equipped with Ethernet, RS422 serial port, RS232 serial port, CAN, and PPS interfaces. With the unique measurement-free / self-calibration algorithm and the multi-strategy positioning algorithm engine, it can still output stable and reliable position and attitude information in challenging environments such as dense foliage obstruction and urban canyons.

- **Automotive-grade Design**

  The receiver is equipped with an automotive-grade GNSS chip and an IMU with ASIL B functional safety level. It uses automotive-grade connectors such as FAKRA, which are commonly found in vehicle front-end applications, ensuring both safety and reliability with excellent cost performance.

- **Redundant Backup Algorithm Engine**

  The positioning engine integrates the advantages of various algorithms such as PVT, RTK, loose and tight coupling navigation. It incorporates multi-strategy redundant backup and establishes two sets of interference and anomaly signal detection algorithms for GNSS and IMU, enhancing positioning reliability and accuracy in harsh environments.

- **Rich Peripheral Interfaces**

  Supports multiple interfaces, including Ethernet, CAN, RS422, RS232, and PPS. It also supports PPS, GPTP, and NTP time synchronization, enabling seamless integration with other sensors (such as Lidar, domain controllers) for coordinated operation.

- **Scene Optimization**

  The system is optimized for typical scenarios such as low-speed vehicle applications, ports, and mines. It is capable of handling complex road conditions (such as speed bumps, rough roads, overpasses, tunnel entrances and exits), providing continuous, stable, and reliable real-time high-precision position and attitude services for various vehicle types, including tracked and wheeled vehicles.

PBOX

Website Social Media

GNSS Performance

GNSS Band	BDS		B1I、B1C、B2I、B2a、B2b*
	GPS		L1 C/A、L2C、L2P*、L5
	Galileo		E1、E5a、E5b
	GLONASS		G1、G2*
	QZSS		L1 C/A、L2C、L5
	NavIC		L5*
	SBAS		L1*
	Lband*		
Positioning Accuracy（1 σ）	Single Point	Horizontal:1.5m	Vertical:2.5m
	DGPS	Horizontal:0.4m	Vertical:0.8m
	PPP	Horizontal:10cm	Vertical:20cm@10min
	RTK	Horizontal:0.8cm + 1ppm	Vertical:1.5cm+1ppm
Velocity Accuracy（1 σ）	0.03m/s		
Directional Accuracy（1 σ）	0.1°/m baseline		
Timing Accuracy	PPS ≤10ns	GPTP≤1us	NTP ≤10ms
Cold Start	30s		
Output Frequency	10Hz （Max 20Hz）		

IMU

Gyroscope		Accelerometer	
Measure Range	±300 °/s	Measure Range	±6 g
Bias Instability	1.8 °/h (XY) 1.4 °/h (Z)	Bias Instability	15 μg
Angle Random Walk	0.09 °/√h (XY) 0.10 °/√h (Z)	Angle Random Walk	0.035 m/s/ √ h
		Output Frequency	200Hz

Communications

External Interface	Main connector: RS232 x 2、RS422 x 1、CAN x 2、Ethernet、PPS
	2 x GNSS Antenna interface （Fakra）
	4G*、Lora*

Electrical indicators

Working Voltage	9~36V	Power Consumption	＜2W

Physical

Size	15 x 12.3 x 3.1cm	Weight	＜450g （Without antenna and cables）
Humidity	95% No condensation	Water/Dust Proof	IP67
Operating Temperature	-40℃~+85℃	Storage Temperature	-55℃~+95℃
Shock	EP455 Section5.15.1 Random		

Combined Navigation Performance Indicators

GNSS Interrupt Time	Position Accuracy(m)		Speed Accuracy(m/s)		Attitude Accuracy(°)	
	Horizontal	Vertical	Horizontal	Vertical	Heading	Posture
0s	0.02	0.03	0.02	0.01	0.08	0.08
10s	0.19	0.12	0.05	0.02	0.10	0.04
60s	2.5	1.1	0.15	0.06	0.16	0.075

*Supported in subsequent firmware updates