



# Dual-antenna GNSS Board for high-precision Heading and Positioning

The B210 GNSS OEM board uses Vanguard Technology™ and a dual-antenna VHD engine to provide accurate 2D attitude determination with centimeter-level RTK positioning for your most challenging environments.

A powerful blend of positioning, attitude, and communication capabilities make the B210 extremely flexible and well-suited for a wide range of industries and applications where accurate and reliable 2D attitude parameters are needed.

## Unique Universal Tracking Channels™ Technology

## High-performance RTK engine with position and attitude update rate up to 100 Hz

## VHD heading engine for fast initialization and high-precision heading output

## Hardware-ready for PPP via L-band satellite downlink or Internet

### FEATURES

POSITION	<b>DION™</b> Active filter reduces disturbances in positional results, leading to smoother, more consistent output in static and dynamic applications; also allows seamless transition between positioning modes
	<b>Multipath mitigation</b> A proprietary signal-processing algorithm mitigates multipath effect on satellite measurements
	<b>Quartz-Lock Loop™ (QLL)</b> Patented technology eliminates satellite tracking failures and positioning degradation caused by vibration and shock
	<b>Ion Shield™</b> Continuously monitor ionospheric conditions and rapidly switch to iono-free combination if ionospheric disturbances have been detected
VELOCITY	<b>Doppler filter</b> Configure the filter bandwidth to optimize trade-off between noise and dynamic errors, which prevents overshooting velocity output during abrupt changes
	<b>Velocity filter</b> Adaptively reduces noise errors while correcting dynamic errors in raw velocity estimates
HEADING	<b>VHD</b> Attitude determination engine leverages equal RF channels, dual-frequency measurements, and up to 100 Hz update rate to enable enhanced heading availability, accuracy, and reliability throughout your job site, even in signal degraded environments

A development kit is available to help you rapidly explore and evaluate features and performance of the B210.

Ordering Information: PN 1022019-02

- Description:
- Evaluation board and B210 board with firmware and OAF
  - Power supply and communication cables

Complete documentation and design resources are available to reduce your development costs and time as well as minimize design risks and test time. Downloads are available at [mytopcon.com](http://mytopcon.com).

# B210 GNSS OEM Board

## Tracking

Channels	226 Universal Tracking Channels™
Signals Tracked	GPS: L1, L2, L2C, L5 GLONASS: L1, L2, L3 Galileo: E1, E5a, E5b, E5AltBOC BeiDou: B1, B2 QZSS: L1, L2, L1C, L1-SAIF, L2C, L5 SBAS: L1 L-Band

## Accuracy\* (RMS)

Standalone	H: 1.2 m; V: 1.8 m
DGPS	H: 0.3 m; V: 0.5 m
SBAS	H: 0.8 m; V: 1.2 m
RTK	H: 5 mm + 0.5 ppm x baseline; V: 10 mm + 0.8 ppm x baseline
RTK Initialization	Time: < 10 seconds Reliability: > 99%
VHD	Heading 0.1°/D, where D is the inter-antenna distance in meters Inclination 0.1°/D, where D is the inter-antenna distance in meters
Velocity	0.02 m/second
Time	30 nsec

## Acquisition Time

Hot / Cold Start	< 15 sec / < 44 sec typical
Reacquisition	< 1 sec

## Communication Interfaces

RS232	2x ports up to 460.8 kbps
LVTTTL UART	2x ports up to 460.8 kbps
USB 2.0 (client)	1x port up to 480 mbps (High Speed)
CAN	2x port (without transceivers), CAN 2.0 A/B, NMEA2000
Ethernet	1x port supporting TCP/IP, FTP, Ntrip Server/Client

## I/O

PPS	2x output with 5 ns resolution, LVTTTL, configurable edge, period, offset, and reference time
EVENT	2x input with 5 ns resolution, LVTTTL, configurable edge and reference time

## Data and Memory

SD card support	External SD card memory capacity up to 32 GB
Data Update/Output Rate	1 Hz – 100 Hz Selectable
Data Formats	TPS, RTCM SC104 2.x and 3.x, BINEX, CMR/CMR+*2
ASCII Output	NMEA 0183 versions 2.x, 3.x, and 4.x

## Environmental

Temperature	Operating: -40°C to 80°C; Storage: -40°C to 85°C
Vibration	4g Sine Vibe (SAEJ1211); 7.7g Random Vibe (MIL-STD 810F)
Humidity	95%, non-condensing
Shock	Operational IEC68-2-27, 11ms, 40g; Survival IEC68-2-27, 11ms, 75g
Acceleration	20g

## Power

Voltage / Power Consumption	3.3 VDC to 4.5 VDC / 2.5 W typical (Standalone; all signals); 3 W typical (RTK L1/L2); 3.3 W typical (VHD); 4.0 W max
LNA Power	+5.0 VDC at 0 – 100 mA

## Physical

Dimensions	60 x 100 x 12 mm
Weight	< 60 g
Main Connector	160-pin Molex
Antenna Inputs and Connector	3, ESD protected, MMCX Female

\* Specifications will vary depending on the number of satellites used, obstructions, satellite geometry (PDOP), multipath effects, and atmospheric conditions. For maximum system accuracy, always follow best practices for GNSS data collection.



For more information:  
[topconpositioning.com/b210](http://topconpositioning.com/b210)

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