

VBOX 3iS Dual Antenna RTK (RLVB3iSDR)



The VBOX 3iS Dual Antenna RTK is a compact GNSS-aided inertial navigation system (INS) with Ethernet robot connectivity and the ability to utilise wheel speed data from a vehicle's CAN bus.

In areas with poor satellite coverage, combining wheel speed and survey grade GNSS measurements with the IMU data in a Kalman filter maintains accurate measurement of speed, heading and position anywhere.

As well as highly accurate position, speed, acceleration, and orientation data, the VBOX 3iS Dual Antenna can measure brake stop distance and slip angle at 100Hz.

The VBOX 3iS Dual Antenna is RTK (Real-time Kinematic) enabled, offering cm-accuracy when used in conjunction with an RTK base station or other RTCMv3 correction sources such as NTRIP. This enables it to be used as a moving target, as part of a VBOX ADAS setup, or with a steering robot, to which it can connect via Ethernet.



Features

- 100 Hz RTK enabled GNSS receiver with two antennas
- Centimetre-level position accuracy
- Integrated Inertial Measurement Unit
- Can be used in a target vehicle for ADAS testing
- Utilises CAN wheel speed data for enhanced accuracy in areas with poor satellite visibility
- Dedicated Ethernet port for compatible steering robots
- Connects to any data logger via Serial or CAN
- CAN bus output includes speed, body heading, pitch and roll angles, brake stop distance, radius of turn, accelerometer, and gyro data
- Serial output of NMEA and attitude channels
- Compatible with DGNSS Base Station and NTRIP modems
- Rugged Deutsch ASDD Autosport connector
- High resolution event marker to precisely capture the start of tests such as braking

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Inputs

Unit Power	
Input Voltage Range	7.5 – 30 V DC
Power Consumption	7.5 W max
Digital Input	
Input Function	Brake event trigger/ track marker
CAN Input	
Input Function	Wheel speed input
RS232 Input	
Input Function	DGPS/RTK Corrections
	Configuration/ External IMU

Outputs

CAN Bus	
Output Data Rate	125 kbit/s, 250 kbit/s, 500 kbit/s & 1 Mbit/s selectable baud rate. Software controlled CAN termination.
Data available	Outputs: Satellite count, time, position, speed, course over ground heading, vertical velocity, longitudinal acceleration, lateral acceleration, distance, slip angle, roll angle, pitch angle, yaw angle (body), X acceleration, Y acceleration, Z acceleration, roll rate, pitch rate and yaw rate Results: Trigger event time, trigger speed, start speed, end speed, deceleration test time, lap time, split time, radius of turn.
RS232	
Output Data Rate	Up to 100Hz
Ethernet Output	
Output Data Rate	100 Hz
Digital Output	
Signal Levels	Low = 0 V, High = 5 V, Max. frequency 4.4 kHz
Output Type	Speed or Lap Beacon
GNSS Antenna Supply	
Supply Voltage	5 V DC

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GNSS Specifications

Velocity		Absolute Positioning (RMS)	
Accuracy	0.1 km/h (averaged over 4 samples)	Accuracy* with RTK	V: 10 mm; H: 5 mm
Units	km/h or mph	Accuracy* with DGPS	V: 0.5 m; H: 0.3 m
Update rate	100 Hz	Accuracy* with SBAS	V: 1.2 m; H: 0.8 m
Maximum velocity	1000 mph	Accuracy* (Standalone)	V: 1.8 m; H: 1.2 m
Minimum velocity	0.1 km/h		
Resolution	0.01 km/h	Update rate	100 Hz
Latency	20 ms fixed	Resolution	1.8 mm

Acceleration		Distance	
Accuracy	0.50 %	Accuracy	0.05 % (<50 cm per km)
Maximum	20 g	Units	m / ft
Resolution	0.01 g	Update rate	100 Hz
Update rate	100 Hz	Resolution	1 cm

Heading		Time	
Resolution	0.01°	Resolution	0.01 s
Accuracy	0.1°	Accuracy	0.01 s

Brake Stop Accuracy			
Accuracy	±1.8 cm		

*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.

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IMU Specifications

	Gyroscopes (Angular rate sensors)	Accelerometers
Dynamic range	± 450 °/s	$\pm 20g$
Nonlinearity	0.01 % of full scale	0.1 % of full scale
Effective Resolution	20-bits (0.00085 °/s)	20-bits (0.00004 mg)
Bandwidth	50 Hz	50 Hz
Noise density	0.01 °/s/√Hz	60 μg/√Hz
Bias stability	0.0028 °/s	15 μg
Bias repeatability (1 year)	0.2 °/s	0.005g

Slip Angle Accuracy

Antenna Separation	Slip Angle (RMS)
0.5m	<0.2°
1.0m	<0.1°
1.5m	<0.067°
2.0m	<0.05°
2.5m	<0.04°

Roll and Pitch Angle Accuracy

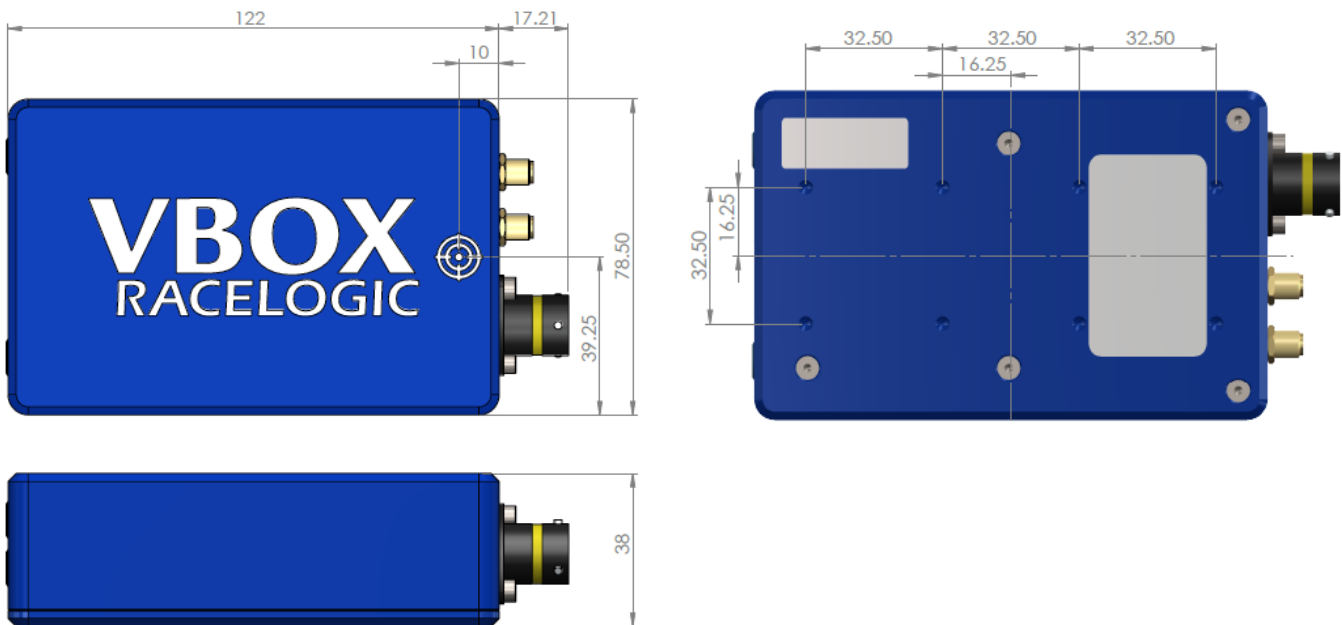
	Pitch Angle	Roll Angle
Accuracy (RMS)	0.06°	0.06°

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Environmental and Physical

Environmental and physical			
Weight	Approx. 480g	Operating temperature	-20°C to +70°C
Size	139.21 x 78.5 x 38 mm	Storage temperature	-40°C to +85°C
IP rating	IP67		



Package Contents

Description	Product Code
1x VBOX 3iSDR	VB3iSDR-V1
1x GPS/GLONASS L1 antenna with detachable RG 223 SMA-SMA cable (4 m)	RLACS156RTK
1x GPS/GLONASS L1/L2 antenna with detachable RG223 SMA-SMA cable (4 m)	RLACS283
1x Serial Configuration cable (2 m)	RLCAB001
1x Deutsch 23W ASDD to multiple connectors interface cable	RLCAB163
1x Carry Case	RLACS106
1x UKAS Accredited Calibration Certificate	RLCALUCAS