VBOX IISX – Dual Antenna (RLVB20SL)

The **VBOX IISX Dual Antenna** (VB20SL) is a powerful instrument for measuring the speed, position and angle of a moving vehicle. Utilising a new generation of high performance satellite receivers, this 20Hz data logger will accurately measuring acceleration, braking distances, lap times, cornering forces alongside slip, pitch and roll angle parameters.
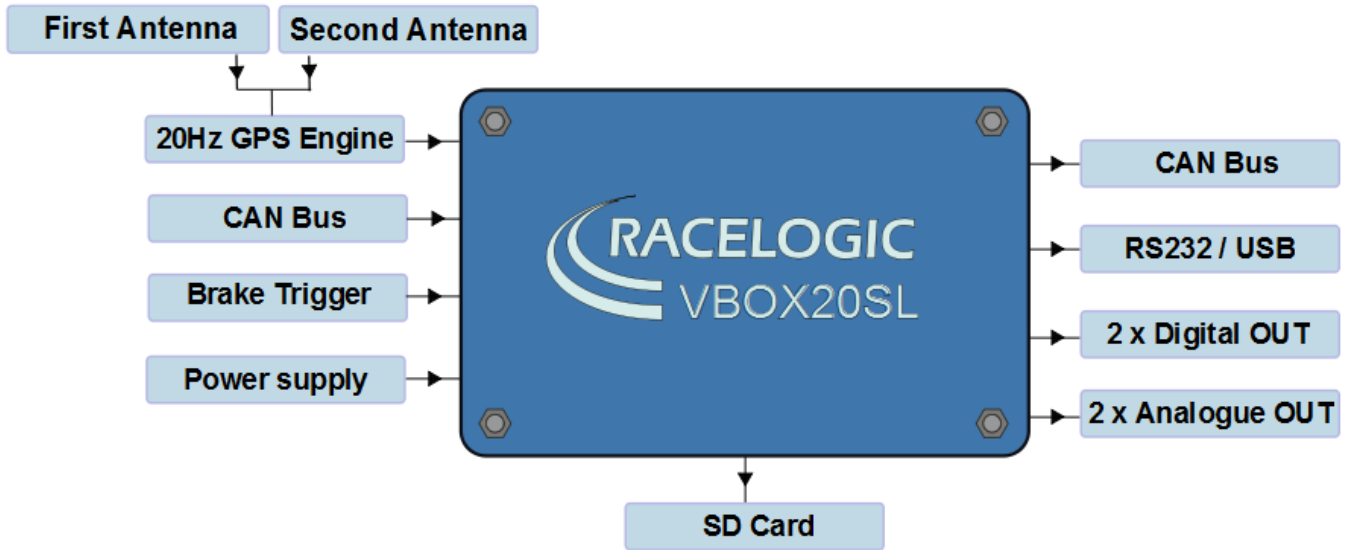
Two antennas are placed on the vehicle a set distance apart. When this distance is entered into the VBOX using the front panel display, an algorithm then uses this 'fixed baseline' to determine the relative position and height of each antenna to a few millimetres.

Due to its small size and simple installation procedure with a built-in configuration screen, the VB20SL is ideally suited for use in cars, bikes, off-road vehicles and boats.

Features

- Non-contact speed and distance measurement using GPS

- 20Hz update rate

- Simultaneous measurement of Slip, Pitch/Roll Angle, Yaw Rate, True Heading and Velocity

- CAN Bus interface for connection to VBOX Input modules

- USB Interface

- RS-232 serial interface

- SD card support

- 2x Analogue speed, slip angle, pitch angle, roll angle outputs

- 2x Digital speed, slip angle, pitch angle, roll angle outputs

- Digital input/output (Oversampled input for digital signals)

- OLED screen display

- Front panel configuration

- Logging up to 20 data channels (In addition to 13 standard GPS channels)

Inputs / Outputs

Inputs	Outputs
2x GPS antenna By utilising two GPS engines configured in a 'Fixed baseline RTK setup', True Heading, Yaw Rate, lateral and Longitudinal Velocity, Slip and Pitch Angle can be measured, (slip is measured at the point at which you place the main reference antenna. This can be translated to any point on the vehicle in post processing).	**CAN BUS** By utilising spare CAN Bus connections VBOX GPS can transmit data while logging readouts from external module inputs.
CAN BUS Data can be logged from external modules (e.g. TC8, FIM02). Up to 16 CAN signals can also be logged from a different CAN source (e.g. Vehicle CAN Bus). When logging data from another source, VBOX Tools can load signal data from an industry standard CAN database file (.DBC).	**RS232/USB** RS232 connector is used for VBOX configuration and output of real-time GPS data. A USB port is also present giving the same functionality for PC's with USB sockets.

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Brake Trigger	2x Digital Outputs
By using a physical switch on the brake pedal, a precise 'start of braking event' can be captured. This is required to capture true Stopping Distance to the accuracy quoted.	Both digital outputs can be configured to output velocity (or other GPS parameters) for use by additional data logging equipment.
Power Supply	**2x Analogue Outputs**
VBOX SX – Triple antenna (SL) can accept a supply voltage between 6 to 30v DC. Low current consumption results in extended battery life.	2x 16bit analogue outputs can be configured to output velocity (or other GPS parameters) for use by additional data logging equipment. The voltage output range is from 0 to 5v DC with a resolution of 76 µV per bit.

SD card

VB20SL can accept most types of SD card. Data is stored in a standard PC format allowing fast transfer of data to a PC equipped with a SD card reader. The file format is an ASCII text file that can be loaded directly into VBOX Tools software, or imported into Excel and other third party software.

GPS Specifications

Velocity		Distance	
Accuracy	0.1 Km/h (averaged over 4 samples)	**Accuracy**	0.05 % (<50cm per Km)
Units	Km/h or Mph	**Units**	Metres / Feet
Update rate	20 Hz	**Update rate**	20 Hz
Maximum velocity	1000 Mph	**Resolution**	1 cm
Minimum velocity	0.1 Km/h	**Height accuracy**	6 Metres 95% CEP*
Resolution	0.01 Km/h	**Height accuracy with DGPS**	2 metres 95% CEP*
Latency	30.5 ms (31.5ms when using twin antennas)		

* 95% CEP (Circle of Error Probable) means 95% of the time the position readings will fall within a circle of the stated radius.

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Absolute Positioning		Time	
Accuracy	3m 95% CEP*	*Accel/ Brake Test (MFD/ VBOX Tools):*	
Accuracy with SBAS DGPS Europe (EGNOS) USA (WAAS) + ASIA (MSAS)	80cm 95% CEP* 1.5m 95% CEP*	Resolution Accuracy	0.01s 0.05s
Accuracy with DGPS Base Station	40cm 95% CEP*		
Update rate	20 Hz	*Lap Timing (OLED/ VBOX Tools):*	
Resolution	1.85cm	Resolution	0.01s
		Accuracy	0.01s**
Height accuracy	6 m 95% CEP*		
Height accuracy with SBAS DGPS	2 m 95% CEP*		

Heading		Brake stop accuracy	
Resolution	0.01°	Accuracy	+/- 10cm
Accuracy	0.1°		

Acceleration		Power	
Accuracy	0.50%	Input Voltage range	6 – 30v DC
Maximum	20 G	Power	9 watts
Resolution	0.01 G	Current	560mA (Typically)
Update rate	20 Hz		

Environmental and physical		Memory	
Weight	Approx. 690 grams	External memory support	SD Card
Size	155mm x 108mm (decreasing to 99mm) x 45mm	Recording time	Dependent on SC capacity***
Industrial Protective Class (with case closed)	IP 64		
Operating Temperature	-30˚C to +60˚C		
Storage Temperature	-40°C to +85°C		

* 95% CEP (Circle of Error Probable) means 95% of the time the position readings will fall within a circle of the stated radius.
**Not using DGPS and crossing the start/finish line at 100km/h
***Approx. 12.8 megabytes per hour used while logging all GPS and slip module channels

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Slip Angle	
Accuracy	<0.5° rms at 0.5m antenna separation
	<0.1° rms at 2m antenna separation

Pitch / Roll Angle	
Accuracy	<1.0° rms at 0.5m antenna separation
	<0.25° rms at 2m antenna separation

YAW Rate	
YAW Rate RMS noise	0.75 degrees/second****

Definitions

* 95% CEP (Circle of Error Probable) means 95% of the time the position readings will fall within a circle of the stated radius.

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****Note that for comparison, the VBOX YAW02 or IMU rate sensor has an RMS noise of 0.05 degrees per second, so it should be noted that the Slip Angle sensor calculated YAW rate is significantly noisier than a solid state sensor for YAW rate measurement.

Outputs

CAN BUS	
Bit rate	User selectable to any value – pre-defined to 125Kbit/s 250Kbit/s, 500Kbit/s & 1Mbit/s selectable baud rate.
Identifier type	Standard 11bit 2.0A (Default) / User definable 2.0A or 2.0B
Data available	Satellites in view, Latitude, Longitude, Velocity, Heading, Altitude, Vertical velocity, Distance, Longitudinal Acceleration & Lateral Acceleration, Distance from Trigger, Trigger Time, Trigger Velocity, True Heading, Slip Angle, Pitch Angle, Roll Angle, Yaw Rate, Lateral Velocity

Analogue	
Voltage range	0 to 5V DC (Velocity) / -5 to 5V DC (Slip, Pitch and Roll)
Default setting*	0.0125V per Km/h (0 to 400Km/h)
Accuracy	0.1 Km/h

Digital	
Frequency range	DC to 44.4Khz
Default setting*	25Hz per Km/h (0 to 400Km/h)
Accuracy	0.01Km/h @ 100Km/h

Definitions

*Range default settings can be adjusted on the front panel or via the software.

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Hardware & Software Support

Support	
Hardware	One Year Support Contract
Software	Lifetime Support Contract: Valid for a minimum of 5 years from the date of purchase and limited to the original purchaser. Contract includes: telephone/ email technical support provided by local VBOX Distributor and firmware/ software upgrades (where applicable).

Package Contents

Description	Product Code
1x VBOX II SX with Slip 20Hz unit	VB20SL-V3
1x Mains Power Supply	RLVBACS020
1x Power cable – 2-way Lemo to Cigar plug (12VDC) 2m	RLCAB010L
2x GPS Ground Plane Antenna with detachable RG-174 SMA-SMA	RLACS103
1x USB 'A' to USB 'B' lead (2m)	RLCAB042
1x Serial PC Cable - 5way Lemo Plug – 9W D-socket (2m)	RLCAB001
1x 4Gb SD Card	RLACS137
1x VBOX Software CD	RLVBACS030
VBOX Padded Carrying Case	RLVBACS013

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