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 20 Hz 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.
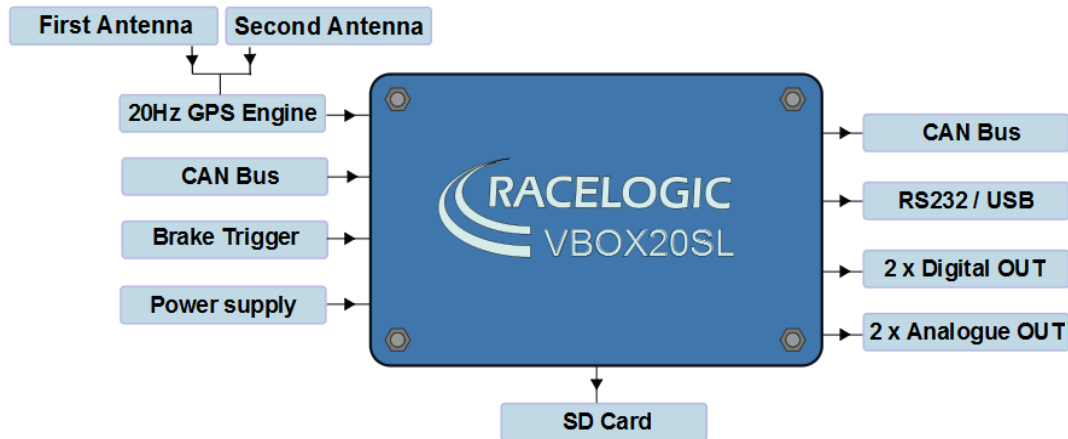
Features

- Non-contact speed and distance measurement using GPS
- 20 Hz 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 Test Suite 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.
Brake Trigger 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.	**2x Digital Outputs** Both digital outputs can be configured to output velocity (or other GPS parameters) for use by additional data logging equipment.
Power Supply The VB20SL can accept a supply voltage between 6 to 30 V DC. Low current consumption results in extended battery life.	**2x Analogue Outputs** 2x 16-bit 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 5 V 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 Test Suite software or imported into Excel and other third-party software.

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Outputs

CAN BUS	
Bit rate	User selectable to any value – pre-defined to 125 Kbit/s 250 Kbit/s, 500 Kbit/s & 1 Mbit/s selectable baud rate.
Identifier type	Standard 11 bit 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 5 V DC (Velocity) / -5 to 5 V DC (Slip, Pitch and Roll)
Default setting*	0.0125 V per km/h (0 to 400 km/h)
Accuracy	0.1 km/h

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

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

Specifications

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

**Approx. 12.8 MB/hr used while logging all GPS and slip module channels

GPS Specifications

Velocity		Distance	
Accuracy	0.1 km/h (averaged over 4 samples)	**Accuracy**	0.05 % (<50 cm per km)
Units	km/h or mph	**Units**	m or ft
Update rate	20 Hz	**Update rate**	20 Hz
Maximum velocity	1000 mph	**Resolution**	1 cm
Minimum velocity	0.1 km/h		
Resolution	0.01 km/h		
Latency	30.5 ms (31.5ms when using two antennas)		

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

Heading		Brake stop accuracy	
Resolution	0.01°	**Accuracy**	± 10 cm
Accuracy	0.1°		

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

* 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 100 km/h

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Slip Angle	0.5 m	1 m	2 m antenna separation
Accuracy	<0.5° rms	<0.25° rms	<0.1° rms

Pitch / Roll Angle	0.5 m	1 m	2 m antenna separation
Accuracy	<1.0° rms	<0.5° rms	<0.25° rms

YAW Rate	
YAW Rate RMS noise	0.75 °/s*

*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.

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 IISX with Slip 20 Hz unit	VB20SL-V4
1x Mains Power Supply	RLVBACS020
1x Power cable – 2-way Lemo to Cigar plug (12 V DC) 2 m	RLCAB010LE
2x GPS/GLONASS Low profile antenna with detachable RG-174 SMA-SMA	RLACS156
1x USB 'A' to USB 'B' lead (2m)	RLCAB042
1x Serial PC Cable - 5way Lemo Plug – 9W D-socket (2 m)	RLCAB001
1x 8 GB SD Card	RLACS259
VBOX Padded Carrying Case	RLVBACS013

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