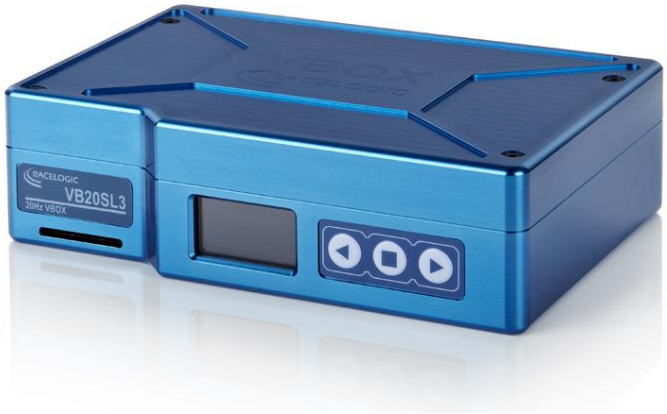
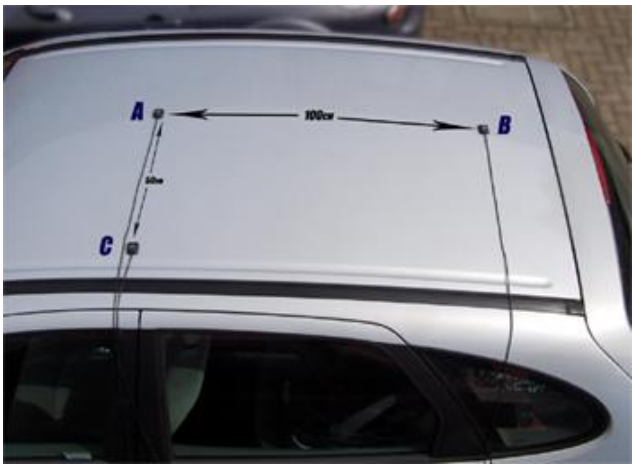
VBOXII SX – Triple Antenna (SL3)

20HZ Data Logger with Slip, Pitch and Roll Angle (RLVB20SL3)

VBOXII SX – Triple Antenna (SL3) 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.





Based on the successful twin antenna VBOX IISX (RLVB20SL) design, the triple antenna VBOXII SX (RLVB20SL3) incorporates a third GPS channel to allow users to measure simultaneous angle measurements along 3 axes. As a small sized unit with simple installation procedures and a built-in configuration screen, the RLVB20SL3 is ideally suited for use in a range of both land and water vehicles.

Antenna A = Primary GPS antenna
Antenna B = Slip/Pitch antenna
Antenna C = Roll Angle antenna

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, velocity, longitudinal and lateral acceleration outputs
- 2x Digital speed, slip angle, pitch angle, roll angle, velocity, longitudinal and lateral acceleration 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)

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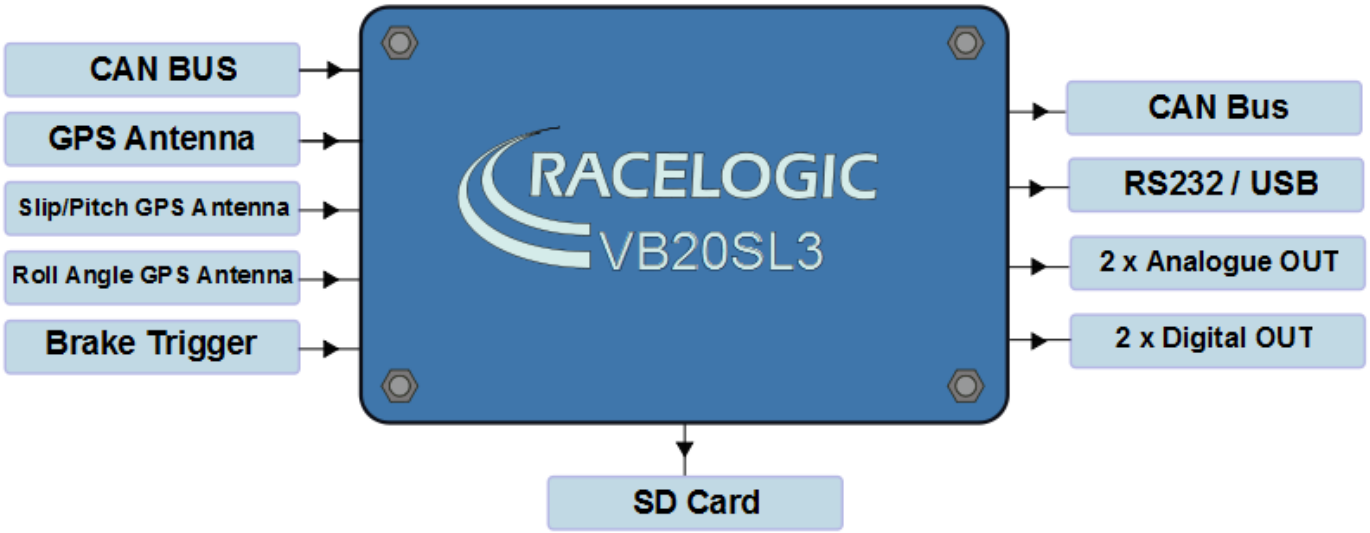
System



Inputs / Outputs

Inputs	Outputs
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).	**CAN BUS** By utilising spare CAN Bus connections VBOX GPS can transmit data while logging readouts from external module inputs.
GPS antenna Primary GPS antenna providing 20Hz update rate for standard GPS parameters (Including: velocity, heading and position)	**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.
Slip/Pitch GPS antenna Slip/Pitch GPS antenna providing 20Hz update rate when measuring Slip/Pitch (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)	**2x Analogue Outputs** 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.

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Roll GPS antenna Roll GPS antenna providing 20Hz update rate when measuring Roll angle.	**2x Digital Outputs** Two digital outputs are available on VBOXII SX – Triple antenna (SL). One Digital output is assigned to Speed/Distance – configurable via Pulses per Meter. While the second is a level switch output enabling users to select any one of the logged channels and assign it a threshold value.
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.	**SD card** VB20SL3 can accept most types of SD card (NOT SD HC). 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.
Power Supply VBOX SX – Triple antenna (SL) can accept a supply voltage between 6 to 30v DC. Low current consumption results in extended battery life.	

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 SBAS DGPS		**Resolution**	0.01 s
• **EU (EGNOS)**	80cm 95% CEP*	**Accuracy**	0.05s
• **USA (WAAS) + ASIA (MSAS)**	1.5m 95% CEP*		
Accuracy w/BaseStation RTCM	40cm 95% CEP*		
Update rate	20 Hz	***Lap Timing (OLED/VBOX Tools)***	
Resolution	1.85 cm	**Resolution**	0.01 s
Height accuracy	6m 95% CEP*	**Accuracy**	0.01 s**
Height accuracy with SBAS DGPS	2m 95% CEP*	** Not using DGPS and crossing the start/finish line at 100km/h	

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

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		
Update rate	20 Hz		

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*

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

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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		

*Approximately 12.8Mb per hour used when logging all GPS and Slip Module channels.

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

* 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/Pitch/Roll 20Hz unit	VB20SL3
1x Mains Charger	RLVBACS020
1x Power cable – 2-way Lemo power lead – Cigar plug (12VDC) 2m	RLCAB010L
3x GPS Ground Plane Antennas	RLACS103
1x USB ‘A’ to USB ‘B’ lead (2m)	RLCAB042
1x Serial PC Cable (5-way Lemo Plug – 9W D-socket -2m)	RLCAB001
1x 2Gb SD card	RLACS083
1x VBOX Tape Measure	RLACS091
1x VBOX Padded carrying case	RLVBACS013
1x Manual	VB20SL3MAN
2x VBOX Software CD	RLVBACS030