



## Overview

The VBOX III represents the 3<sup>rd</sup> generation of GPS data logging system from Racelogic. Using a powerful new GPS engine, the VBOX III can log GPS and other data at 100Hz. The logged data is stored directly onto a compact flash card for easy transfer to a PC.

The VBOX III includes 4 high-resolution analogue input channels and 8 user configurable CAN channels.

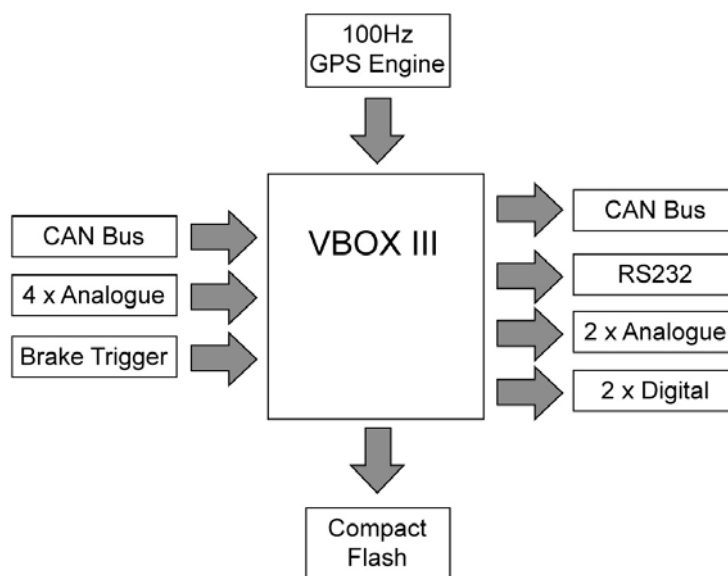
The 2 CAN bus interfaces allow connection of Racelogic input modules while simultaneously transmitting GPS data or receiving vehicle CAN data on the second bus.

In line with previous VBOX models, the VBOX III is compatible with all of the existing peripherals including the Multifunction display, ADC03, TC8, FIM02 and Yaw rate sensor.



## Features

- Non-contact 100Hz speed and distance measurement using GPS
- 12.5ms Latency
- 4 x 24bit differential analogue input channels with  $\pm 50v$  input range and synchronous capture
- Brake/Event Trigger input, 12 $\mu$ S resolution
- 2 x CAN Bus interface for data input & output
- RS-232 serial interface
- Data logged to industry standard Compact Flash memory cards
- 2 x 16bit User configurable analogue outputs
- 2 x Digital outputs
- User configurable trigger options
- Logging rate selectable to 100Hz, 50Hz, 20Hz, 10Hz, 5Hz, 1Hz
- Wide 5.3V to 30V operating range



VBOX III Input & Output



## Details

### GPS

The VBOX III features a powerful new GPS engine capable of providing 100Hz update rate of all GPS parameters including velocity, heading and position. Velocity and heading data are calculated from Doppler shift in the GPS carrier signal to provide high accuracy.

### Analogue Inputs

The 4 analogue input channels on the VBOX III each have a dedicated 24bit analogue converter. Data is recorded from each channel simultaneously to avoid any latency between analogue channel data. The name, scale and offset of each analogue input channel can be adjusted using the VBOX.EXE software to allow sensor calibration and therefore logging of data in standard SI units. The analogue input connector also provides two power outputs that may be used for driving sensors. These are in the form of a 5v DC isolated supply and an output equal to the VBOX power supply voltage.

### Analogue Outputs

The 2 x 16bit analogue outputs can be configured by the user to output velocity or other GPS parameters for use by other data logging equipment. The voltage output range is from 0 to 5v DC with a resolution of 76  $\mu$ V per bit.

### Digital Outputs

There are two digital outputs, one frequency/pulse output that corresponds to velocity and a two-state output to indicate current logging status. The speed pulse output is user configurable, the number of pulses per meter can be changed, allowing emulation of most other types of speed sensor.

### Digital Inputs

Two digital inputs are available on VBOX III. The first input is used for brake trigger or event sensing and is connected to a 16bit event timer to allow correction of brake trigger time to an accuracy of 12 $\mu$ s. The second digital input is used for remote logging control using a hand-held switch.

### CAN Bus

Two CAN Bus interfaces are available on the VBOX III. The use of separate CAN bus connections allows data to be logged from Racelogic external modules, for example TC8 or FIM02, while transmitting VBOX GPS CAN data on the second bus. It is also possible to log 8 CAN signals from another CAN source such as a vehicle CAN bus. When logging data from another source, the VBOX.EXE can load signal data from an industry standard CAN database file (.DBC).

### RS232 Serial

The RS232 connector is used for VBOX configuration and output of real-time GPS data. It is important to note that if the VBOX III is logging to compact flash above 20Hz, the serial data sent in real time to the software is limited by the bandwidth of the PC serial port to 20Hz. Therefore to get the best accuracy, all tests above 20Hz should only be analysed in post processing using the data captured using a compact flash card.

### Compact Flash

The VBOX III can accept Type I compact flash cards for logging of data. Data is stored in a standard PC format allowing fast transfer of data to a PC equipped with a compact flash card reader. The file format is an ASCII text format that can be loaded directly into the VBOX.EXE software or imported into Excel and other third party software.

### Power Supply

The VBOX III can accept a supply voltage in the range of 5.3v to 30v DC.



## GPS

<b>Velocity</b>		<b>Distance</b>	
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	100 Hz	Update rate	100Hz
Maximum velocity	1000 Mph	Resolution	1cm
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**

### Absolute Positioning

Accuracy	3m 95% CEP**
Accuracy with DGPS	1.8m 95% CEP**
Update rate	100 Hz
Resolution	1 cm

### Heading

Resolution	0.01°
Accuracy	0.1°

### Acceleration

Accuracy	0.5%
Maximum	20 G
Resolution	0.01 G
Update rate	100Hz

### Memory

<b>Compact Flash</b>	Type I
Recording time	Dependent on flash card capacity*

\* Approximately 29Mb per hour used when logging GPS data at 100Hz

Approx 182Mb per hour total logging capacity.

### Time

Resolution	0.01 s
Accuracy	0.01 s

### Power

Input Voltage range	5.3v-30v DC
Power	Max 10.6 watts

### Environmental and physical

Weight	Approx 900 grammes
Size	170mm x 121mm x 41mm
Operating temperature	-20°C to +70°C
Storage temperature	-30°C to +80°C

### Definitions

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

## Outputs

### CAN Bus

Bit rate	250Kbits ,500Kbits & 1Mbit selectable baud rate
Identifier type	Standard 11bit 2.0A
Data available	Satellites in View, Latitude, Longitude, Velocity, Heading, Altitude, Vertical velocity, Distance, Longitudinal acceleration & lateral acceleration, Distance from trigger, Trigger time, trigger Velocity

### Analogue

Voltage range	0 to 5Volts DC
Default setting *	Velocity 0.0125Volts per Km/h (0 to 400Km/h)
Accuracy	0.1 Km/h @ 100Km/h
Update rate	100Hz

### Digital

Frequency range	DC to 44.4Khz
Default setting *	25Hz per Km/h (0 to 400Km/h)
Accuracy	90 pulses per metre 0.01Km/h @ 100Km/h
Update rate	100Hz

\* The range settings can be adjusted by the user in software

## Inputs

### CAN Bus

Racelogic modules	Up to 32 channels from any combination of ADC02, ADC03, FIM02, TC8, Yaw sensor or CAN01
External CAN Bus	8 Channels of user definable CAN signal from external bus. Eg; vehicle CAN bus Can load signal data from industry standard DBC database file.

### Analogue

Number Channels	4	Resolution	24 bit
Input range	±50v	DC Accuracy	400 µV
Channel Sample order	Synchronous		

### Digital

Brake/Event Trigger	Selectable signal polarity. 16bit timer capture with 12µs resolution
On/Off Logging control	Remote log control from hand-held switch