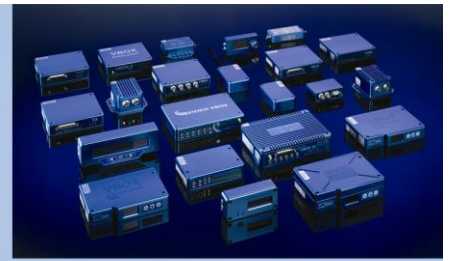


RACELOGIC VBOX 3i

VBOX 100Hz GPS Datalogger



Overview

VBOX 3i represents the most powerful GPS data logging system built by Racelogic. Building on the features of VBOX III, VBOX 3i adds USB and Bluetooth connectivity as well as audio functionality for voice tagging. In addition, the processor has been updated to 400MHz, with a floating-point maths co-processor capable of over 760 million instructions per second. This gives the future option of real-time inertial integration when combined with the Racelogic IMU.

Logged data is stored directly onto a compact flash card for easy transfer to a PC. When used with a DGPS basestation, VBOX 3i is capable of achieving 40cm positional accuracy. A further 2cm 95% CEP (RTK) positional accuracy option is also available, which requires an RTK enabled basestation (RLVBBS3).

In line with previous VBOX models, VBOX 3i is compatible with all existing peripherals including the Multifunction display, ADC03, FIM03, TC8, and Yaw rate sensor.

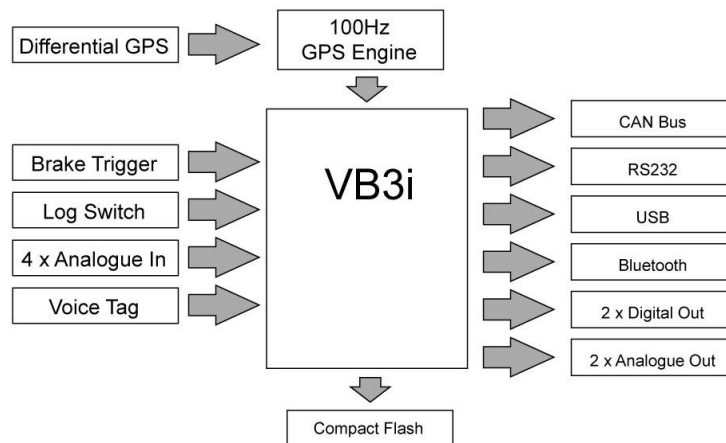


Features

- Non-contact 100Hz speed and distance measurement using GPS
- Improved Latency of just 6.75ms
- 4 x 24bit differential analogue input channels with $\pm 50v$ input range and synchronous capture
- Brake/Event Trigger input of 10 μs resolution.
- 2 x CAN Bus interface for data input & output
- RS-232 serial interface
- USB Interface
- Bluetooth Interface
- Audio voice tagging
- Microphone headset included
- Data logged to Compact Flash memory card
- 2 x 16bit User configurable analogue outputs
- 2 x Digital outputs
- User configurable logging conditions
- Logging rate selectable to 100Hz, 50Hz, 20Hz, 10Hz, 5Hz, 1Hz
- Wide 7V to 30V operating range
- Low current consumption
- Can be used with a differential basestation for positional accuracies of up to 2cm*
- Glonass option available

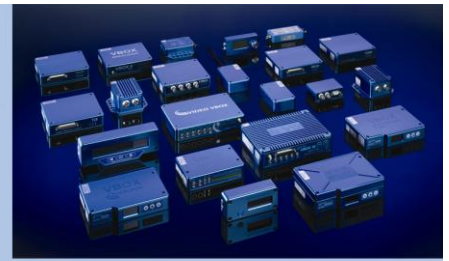
2cm 95% CEP positional accuracy, (requiring RTK VBOX (RLVB3RIR2G2 and RLVBBS3 Basestation)

VBOX 3i Inputs and Outputs



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GPS

VBOX 3i 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 VBOX 3i 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 VBOX Tools 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 μ V per bit.

Digital Outputs

There are two digital outputs, one frequency/pulse output that corresponds to velocity and the other is a two-state output that can use any logged channel as the state triggering parameter. 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 3i. The first input is used for brake trigger or event sensing and is capable of measuring the brake trigger to an accuracy of 10 μ 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 VBOX 3i. 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, VBOX Tools 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. The serial data sent in real time to the software is limited by the bandwidth of the PC serial port to 20Hz. (Full 100hz serial available via USB / Bluetooth.)

Bluetooth

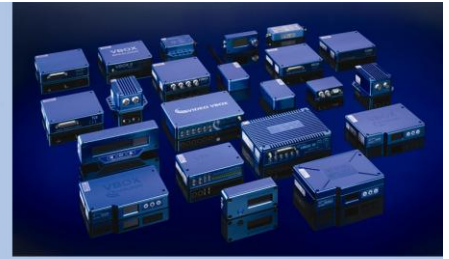
VBOX 3i comes equipped with a Bluetooth Radio allowing remote configuration and remote output of real-time GPS data to any Bluetooth capable PC or Datalogger. The Bluetooth connection is capable of sending data at the full 100Hz rate.

USB

VBOX 3i USB connector can be used for VBOX configuration and output of real-time GPS data at the full 100Hz data rate.

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Audio

VBOX 3i has the capability of recording a GPS synchronised WAV audio tag up to 30 seconds long to a time accuracy of 0.5 sec. The recorded WAV file is then logged to the CF card.

Compact Flash

VBOX 3i 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 file that can be loaded directly into VBOX Tools software, or imported into Excel and other third party software.

Power Supply

VBOX 3i can accept a supply voltage in the range of 7 to 30V DC. Low current consumption results in extended battery life.

Differential GPS

VBOX 3i can work in SBAS or RTCM DGPS modes (all accuracies listed in 95% CEP, see next page):

- SBAS DGPS requires no additional equipment and increases the positional accuracy up to 1m.
- RTCM DGPS offers 40cm accuracy (requires basestation RLVBBS2).
- RTK DGPS offers 2 cm accuracy (requires RTK option and RLVBBS3).

Hardware / Software Support

One Year Hardware/Lifetime Software Support Contract.

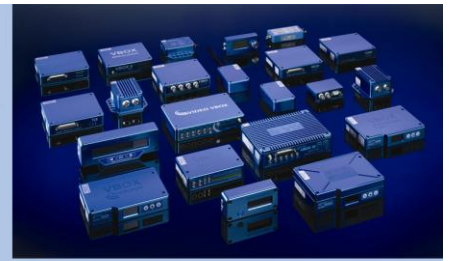
Lifetime Software Support Contract is valid for a minimum of 5 years from the date of purchase and limited to original purchaser. Contract includes telephone/email technical support provided by local VBOX distributor and firmware/software upgrades where applicable.

Package Contents

- | | | | |
|--------------|---|--------------|---|
| • RLVB3i | 1 x 100Hz GPS datalogger | • RLVBCAB01 | 5-way LEMO to 9-way D-type serial cable -2m |
| • RLVBACS020 | 1 x Mains Charger | • ADC25IPCON | 25-way D-type connector |
| • RLVBCAB10 | 12VDC cigar lighter – 2-way LEMO power lead – 1m 2 x spare fuse 3.15A 250V | • RLVBACS013 | VBOX Padded carry case |
| • RLVBACS001 | 1 x GPS antenna (plus 1 spare) | • RLCAB066 | USB A – Mini B Lead |
| • RLACS107 | 2 Gb Compact Flash card | • RLVB3MAN | VBOX User manual |
| • RLVBACS028 | PCMCIA Compact Flash adaptor | • RLVBACS030 | CD ROM containing VBOX Tools, software |
| | | • RLACS119 | Bluetooth Antenna |

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GPS

| | | | |
|------------------|------------------------------------|---------------------------|----------------------|
| 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 | 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** |
| Latency | 6.75ms | | |

Absolute Positioning

| | |
|-------------------------|--------------------------|
| Accuracy | 3m 95% CEP** |
| Accuracy with SBAS DGPS | 1.8m 95% CEP** |
| Accuracy with RTCM DGPS | 40cm 95% CEP** |
| Accuracy with RTK DGPS | 2cm 95% CEP** (optional) |
| Update rate | 100 Hz |
| Resolution | 1.8 mm |

Heading

| | |
|------------|-------|
| Resolution | 0.01° |
| Accuracy | 0.1° |

Acceleration

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

Memory

| | |
|----------------------|-----------------------------------|
| Compact Flash | 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 | 7 – 30V DC |
| Power | Max 5.5 watts |

Environmental and physical

| | |
|-----------------------|----------------------|
| Weight | Approx 900 Grams |
| 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
2cm accuracy requires an RTK option and RTK enabled Basestation

Outputs

CAN Bus

| | |
|-----------------|--|
| Bit rate | 125Kbits, 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 |
| 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 |
| Update rate | 0.1Km/h 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. 10µs resolution |
| On/Off Logging control | Remote log control from hand-held switch |