Radio Telemetry Module

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Introduction

The RLVBRTM modules from Racelogic are radio modems for use with the VBOX range of products. Each module contains a high power radio modem capable of transmitting and receiving RS232 serial data at a range of up to 3500 metres. Two radio telemetry modules may be used for example, to transmit VBOX serial data from a remote unit to a laptop PC. Modules can also be used to receive differential correction information (DGPS) from the Racelogic Base Station for local position correction.

Features

- Powerful 500mW radio giving range up to 3500m
- Simple connection directly to VBOX (one cable)
- Supplied with magnetic mounting antenna

Standard Inventory

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty</th>
<th>Racelogic Part #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio Telemetry Module</td>
<td>1</td>
<td>RLVBRM or RLVBRMEE</td>
</tr>
<tr>
<td>Magnetic Mounting antenna</td>
<td>1</td>
<td>ANTEN-910MAG or ANTEN-858MAG *</td>
</tr>
<tr>
<td>RS232 Cable – Radio to PC</td>
<td>1</td>
<td>RLVBCAB32</td>
</tr>
<tr>
<td>VBOX connection cable – Radio to VBOX</td>
<td>1</td>
<td>RLVBCAB05</td>
</tr>
</tbody>
</table>

*Depending on country
Operation

The radio module power supply range is 6V to 18V. When using with a VBOX logging system, power is obtained through the VBCAB05 connection cable. The maximum operating voltage input must not exceed 18V DC. Therefore when using the module with VBOX III, ensure that the VBOX supply voltage does not exceed 18V.

**Warning!**

While the VBOX III can be powered from voltage sources up to 30V, the radio module cannot. Therefore you must ensure that if using the radio module with VBOX III, the supply voltage does not exceed 18V. Failure to observe this could damage the radio module.

**Warning!**

The connectors used for the GPS antenna on the VBOX and the radio antenna connection on the radio module are both SMA type connectors. It is important to make sure that the GPS antenna is NOT connected to the radio module and that the radio antenna is NOT connected to the VBOX. Failure to observe this could damage the radio module or the VBOX.
Using the radio module with a Racelogic VBOX

The radio module can be used with the Racelogic VBOX in two ways. The first way is as a radio transmitter for sending VBOX telemetry data to another radio module which is connected to a PC. The second way is as a radio receiver to receive RTCM correction data from the Racelogic base station.

Antenna Placement
To ensure the best range possible, the radio antennas should be placed at the highest, un-obscured positions available on the vehicle and at the remote PC location.

Example of Telemetry mode connection with VBOX III
VBOX transmits RS232 data out to radio module for reception by second radio connected to laptop PC. Only one connection is required as power for the Telemetry unit comes from the VBOX in the RLVBCAB05 cable.

NOTE: The VBOX serial output must be set to 5Hz via VBOXTools before it is used with the Telemetry system.
Example of Telemetry mode connection with a Laptop or PC.

The telemetry module picks up the RS232 data from the VBOX via an RF link and makes it available for a remote computer. The remote computer running the supplied VBOX software can show live VBOX data. Using the supplied Report Generator software the data can be processed live so that the results of particular tests can be displayed, ie from a brake trigger to zero km/h with data lines every 10 km/h. The Report Generator software is very flexible so most test scenarios can be specified. In the case of drive by noise test, the velocity can be shown live on the software and then either using Start Finish lines or external optical beacons speed can be captured and displayed at particular points in the test lane.

The protocol of the VBOX RS232 signal is described in a data sheet downloadable from the website for anyone who wishes to use this data in another program or piece of hardware.
Example of Local DGPS operation with VBOX III
VBOX receives RTCM correction data from radio module. Radio module acts as receiver for information transmitted by Racelogic DGPS base station.

Example of Telemetry mode connection with VBOX II
VBOX transmits RS232 data out to radio module for reception by second radio connected to laptop PC.
Example of Local DGPS operation with VBOX II

VBOX receives RTCM correction data from radio module. Radio module acts as receiver for information transmitted by Racelogic DGPS base station.
Specification

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Input voltage</td>
<td>6 to 18VDC</td>
</tr>
<tr>
<td>Input current - Receiving</td>
<td>&lt;100mA</td>
</tr>
<tr>
<td>Input current - Transmitting</td>
<td>&lt;900mA</td>
</tr>
<tr>
<td>Radio data rate</td>
<td>9.6kbit/s</td>
</tr>
<tr>
<td>VBOX/PC data rate</td>
<td>115,200kbit/s</td>
</tr>
</tbody>
</table>

Range

The range of reliable transmission with a Telemetry system, depends on the antenna position and environment.

- Difficult environment (blocked by buildings or trees) – 150 to 300 metres (500 to 1,000 feet).
- Open environment with antennas at ground level (clear view with antennas on car roofs) – 1,000 to 1,400 metres (3,400 to 5,000 feet).
- Open environment with antennas at height (clear view with antennas mounted on masts of building rooftops) – up to 3,500 metres (11,000 feet).
- As an example of performance Basestation telemetry communication range has been measured at larger distances 10,000M when the antennas where on hill tops with line of sight.
Connection Data

![5 pin LEMO socket]

<table>
<thead>
<tr>
<th>PIN</th>
<th>In/Out</th>
<th>Description</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>O</td>
<td>RS232 Rx</td>
<td>±12v</td>
</tr>
<tr>
<td>2</td>
<td>I</td>
<td>RS232 Tx</td>
<td>±12v</td>
</tr>
<tr>
<td>3</td>
<td>-</td>
<td>NC</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>-</td>
<td>NC</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>I</td>
<td>+V Power</td>
<td>6 to 18VDC</td>
</tr>
<tr>
<td>Chassis</td>
<td>I</td>
<td>Ground</td>
<td></td>
</tr>
</tbody>
</table>
Contact Information

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Revision Date Description Author
1 5/5/2005 First Draft KB
2 31/8/2006 Amendments for 5Hz serial VBOX setup KB
3 30/04/08 Updated contact details MG