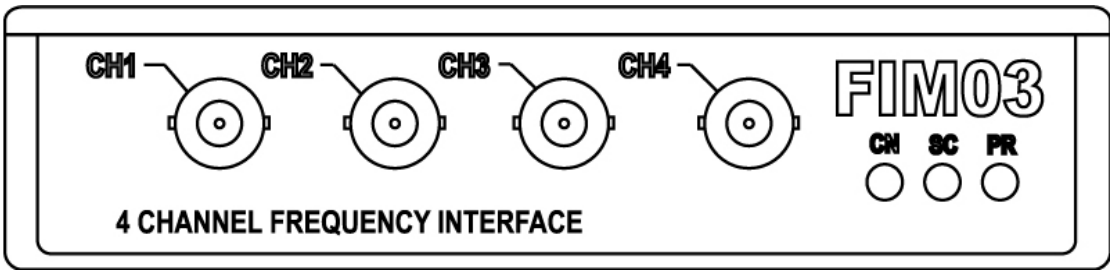
Frequency **I**nput **M**odule
RLVB**FIM**03

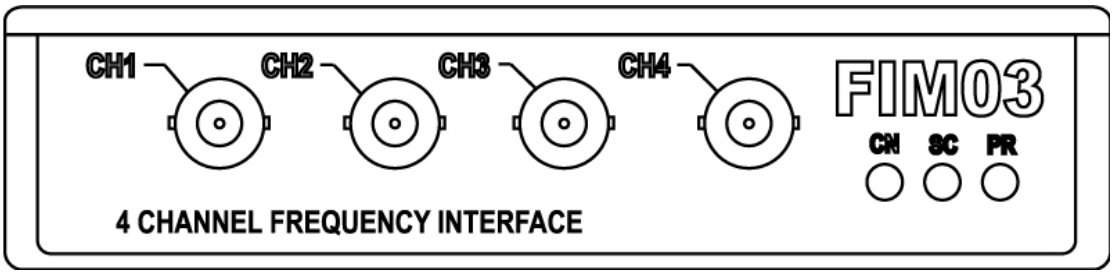
Instruction Manual



Contents

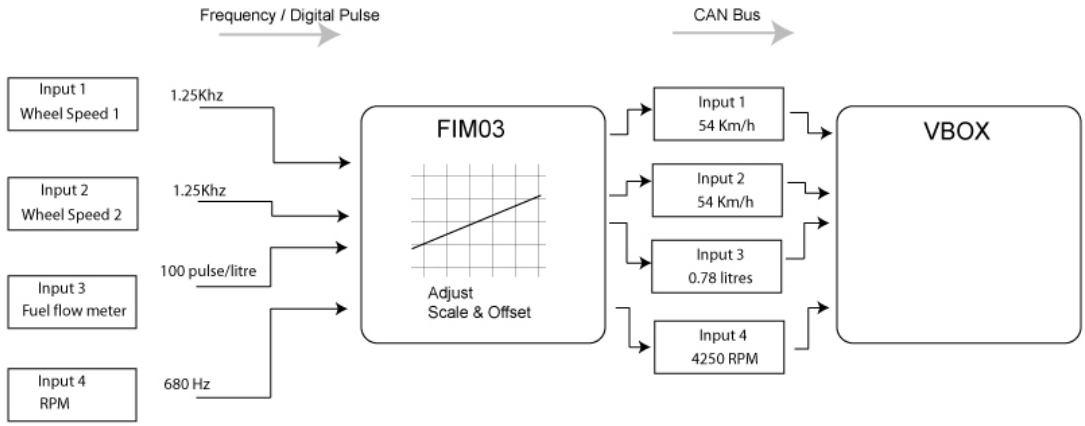
Introduction

The RLVBFIM03 is a 4-channel frequency capture unit. It enables frequency based signals in the range 1 to 32Khz to be recorded by the VBOX data logging system. The input circuits can accept a wide signal amplitude range from TTL signal level up to VRS sensors. This means that direct connection to ABS wheel speed sensors or RPM sensors is possible. The FIM03 can be configured through software to process the input frequency and pulse count information to provide logged data in real units. By configuring a Pulse Per Rev parameter the FIM03 will read data in RPM. Further configuration of Wheel Diameter enables the FIM03 to calculate wheel speed data in Km/h or Mph. It is also possible to manually enter scale and offset values for use with fuel flow meters, pressure sensors and other pulse output devices. In pulse count mode the device can also be configured to reset the count when the VBOX brake trigger is applied.



Key features

- Wide input Voltage range
- 24 Bit Resolution
- 1Hz to 32,000Hz
- Output in Hz, RPM, Km/h, Mph, pulse count or user calibrated units.
- Pulse count mode for precise fuel meter or wheel pulse capture



Parts supplied with RLVBFIM03

1 x **RLVBFIM03**	Frequency Input Module
1 x **RLVBCAB05**	Connection cable to VBOX

Specification

Input voltage (max range)	-50 volts to +50 volts
Minimum signal amplitude	Approx 1v pk-pk
Input frequency range	1Hz to 32Khz
Timer	24 Bit
Timer resolution	67ns
Data output to VBOX	Frequency **Hz** Wheel speed **Km/h** or **Mph** Wheel **RPM** Scaleable pulse count User defined scale and offset for sensor calibration
Signal Input connection	4 x BNC Connector
VBOX Connection	2 x Lemo socket for connection to VBOX CAN Bus
Height	32mm
Width	128mm
Depth	120mm
Operating Voltage	+12v DC

Connection of FIM03 to VBOX

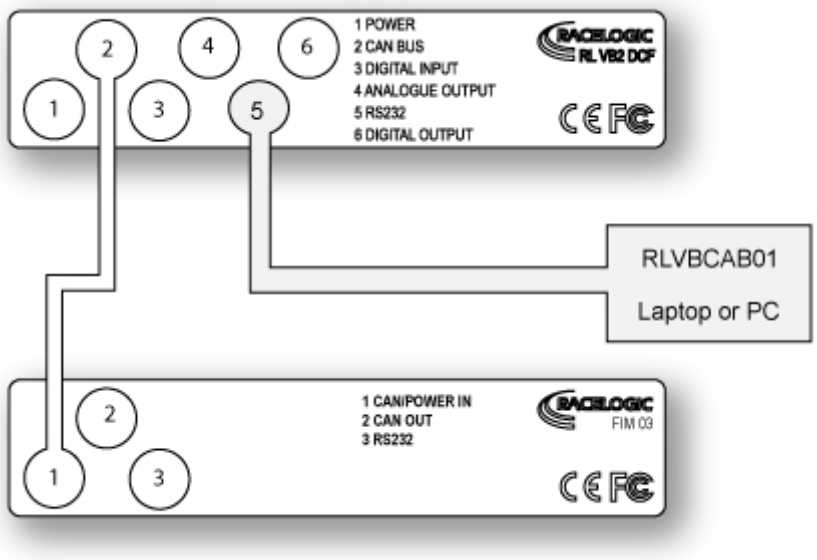


Fig. 1

The FIM03 is supplied with a connecting cable for connection to the VBOX CAN Bus.

Connectors 1 and 2 on the FIM03 share the same pin-out to allow “daisy-chaining” of multiple Racelogic units. It is therefore possible, for example, to link two FIM03 units together with a VBOX to record eight wheel speeds simultaneously.

Setup Channel Information

Set up of the FIM03 is accomplished through the VBOX.EXE software. With the FIM03 connected to the VBOX, ensure that the VBOX is powered and connected to the PC serial port. Click **VBOX Setup** on the main menu bar. When the VBOX Setup window appears, a **FIM Modules** tab should be present under the Log Channels. Click the **FIM Modules** tab. This will display the serial number of the FIM03 module along with 4 channel buttons (fig.2). The check box at the left of each button allows the user to enable (checked) or disable (unchecked) the logging for that channel.

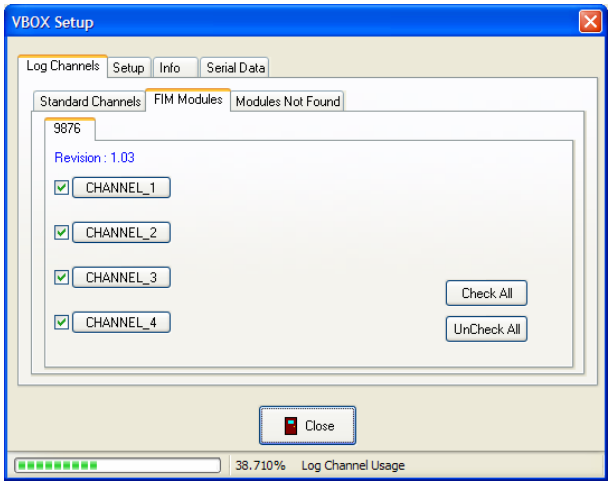


Fig. 2

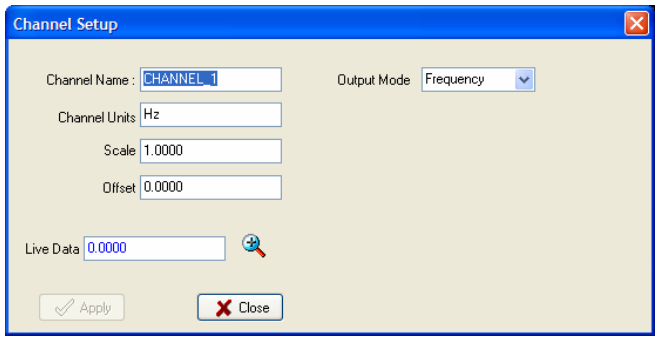


Fig. 3

To configure a channel, click the corresponding button. A channel setup window will appear showing the current settings for Channel Name, Channel units, Output mode, Scale and offset (fig.3).

Channel Name
The user can change the channel name to provide a meaningful description for the input channel.

Units
The units option does not alter the recorded data. It is only a description for the user to understand the data. The value of the data is only affected by the scale and offset values.

Scale
The scale value corresponds to X in the equation Y=MX+C that is applied to the input signal.

Offset
The offset value corresponds to C in the equation Y=MX+C.

In the Y=MX+C equation, Y is the output value that is logged by the VBOX while M corresponds to the input or “Measured” value.

Output Mode
The OUTPUT MODE selection is used to select one of five operating modes for each channel. These are frequency, RPM, mph, km/h and pulse count modes and are described as follows.

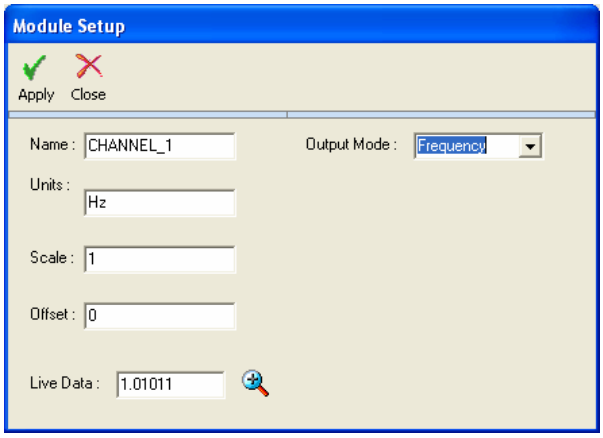


Fig. 4

Output Mode = Frequency

In the frequency mode, the channel will be measured as a direct frequency. Scale and offset are available in this mode. A scale of 1 and offset of 0 will record a value in Hz. Changing the scale and offset allows calibration for SI units when using digital output sensors such as pressure transducers.

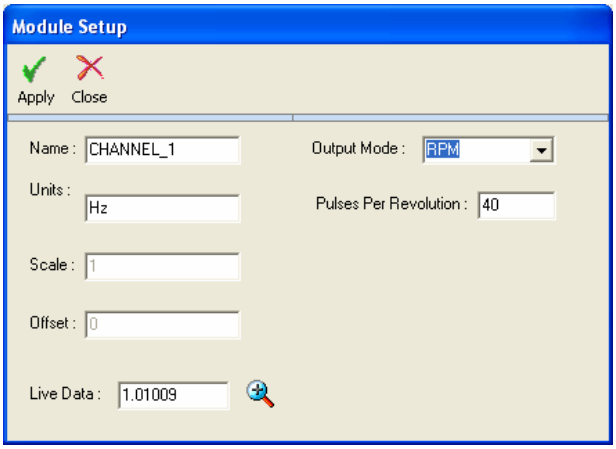


Fig. 5

Output Mode = RPM

In RPM mode, the user must enter a number of pulses per revolution. This enables the FIM03 to calculate and output a figure of revolutions per minute.

For example if an engine RPM sensor has a 60 minus 2 (60-2) crank sensor configuration, the number of pulses for each engine revolution (pulses per revolution) will be 58.

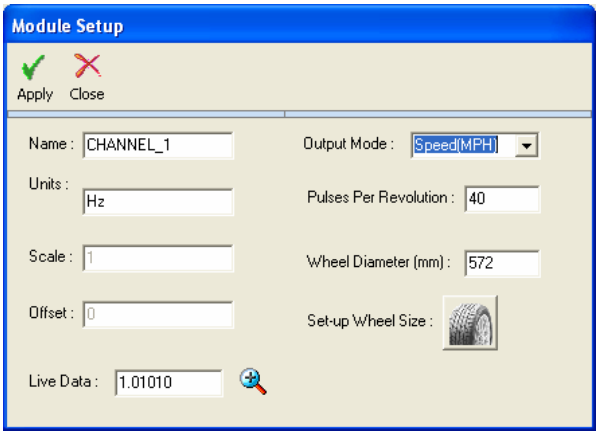


Fig. 6

Output Mode = Speed (Km/h or Mph)

Selecting speed out mode is designed for use in vehicle testing. It enables the user to configure pulses per revolution corresponding to, for example, an ABS wheel speed sensor, and a wheel diameter (in millimetres). Wheel circumference is calculated from the wheel diameter and in conjunction with the pulses per revolution allows the FIM03 to output either Km/h or Mph values for each of the four signal inputs.

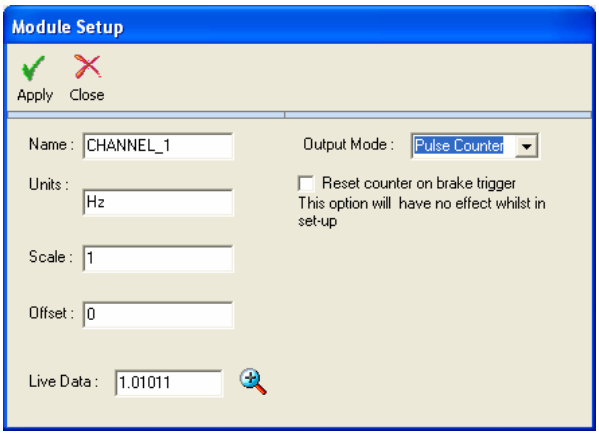


Fig. 7

Output Mode = Pulse Count

Selecting pulse count mode enables the user to view the number of pulses received since the last reset. Using the scaling value this can be converted into, for example, fuel flow by setting the scale value to the number of mg of fuel per injector pulse. The counter can also be configured to reset when the brake trigger signal into the VBOX is activated (this setting will not take effect until set-up is exited).

Live Data

The live data display shows the current value of the channel. This is the value after the scale and offset have been applied, making the live data display a valuable tool for setting up sensor calibrations.

Please note that after making any changes to the channel set up, it is important to click on the “Apply” button to store the changes.

Configuring serial data

In addition to selecting channels for logging, it is also possible to add channels to the serial data, allowing live information to be viewed in the VBOX software. To enable channels in the serial data, first ensure that they are enabled for logging, then click the “FIM modules” tab under the “Serial data” Tab. Then check the channels that are to be sent in the serial data.

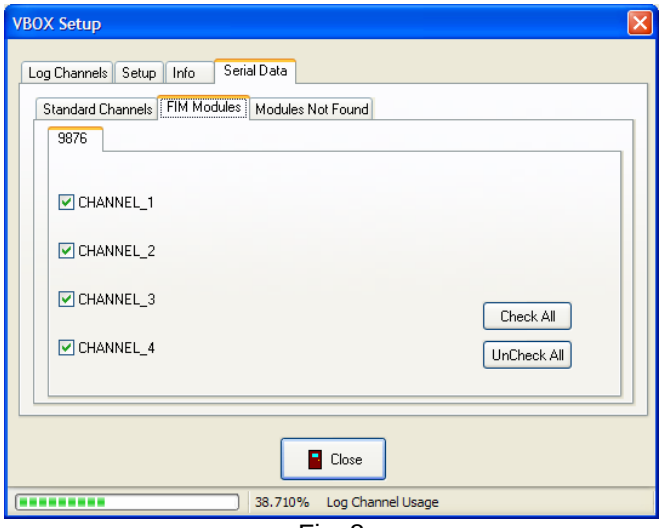


Fig. 8

When channels are added to the serial data, they will appear on the CAN tab of the display configuration window as shown in fig.9. This allows the channel data to be viewed in the main display panels in the VBOX software (fig.10). Clicking the left mouse button on the display panels during use will bring up a real-time scrolling graphical display of the four parameters in the main VBOX display.

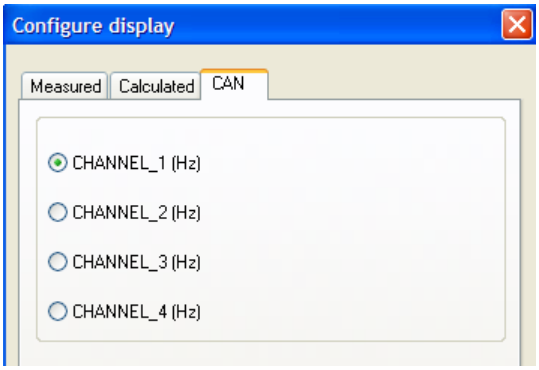


Fig. 9

Fig. 10

Real Time Graphical Display

As previously mentioned, clicking with the left mouse button on one of the data displays (fig.11) will open op the real-time “scope” display. This features a scrolling graph showing the data from all four of the displays.

Fig. 11

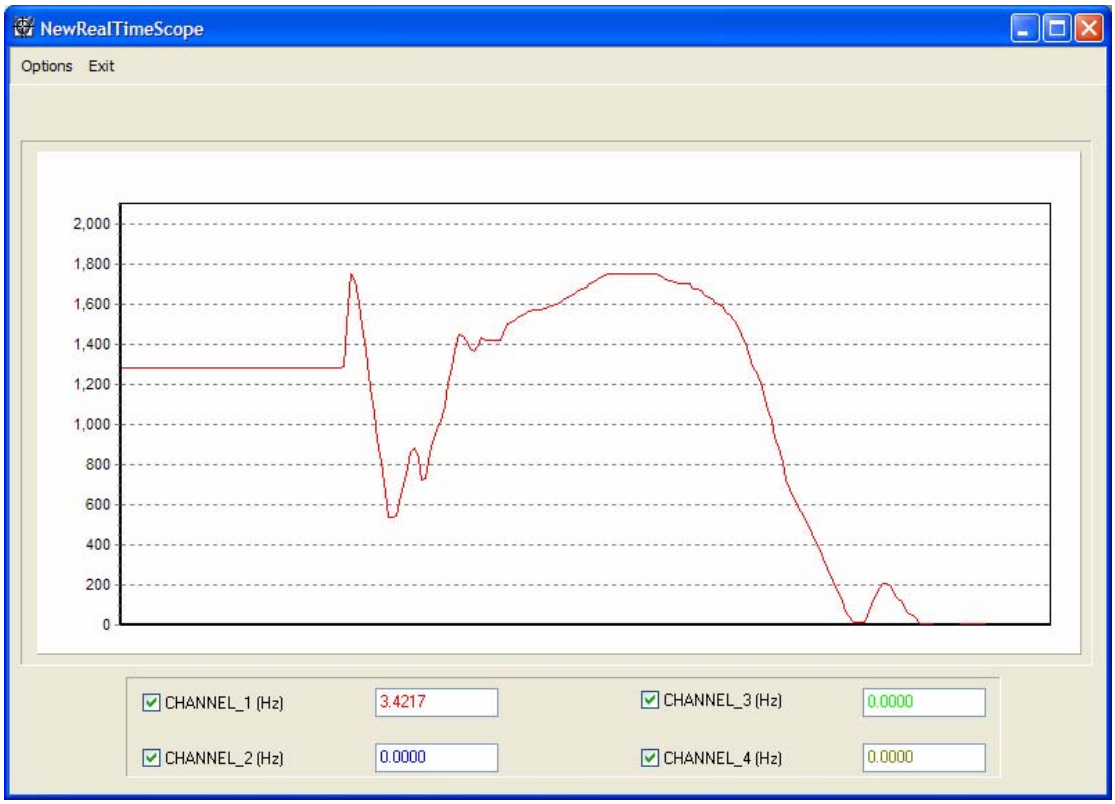


Fig. 12

Example Data

The graph fig.13, below, shows data recorded from 4 wheel speed sensors using the FIM03. Please note that on some ABS systems with inductive type sensors, low-speed spikes are visible in the data. The spikes in the data are a result of the speed sensor signal amplitude dropping out at low speed. Also visible in the data are separations in individual wheel speeds when cornering.

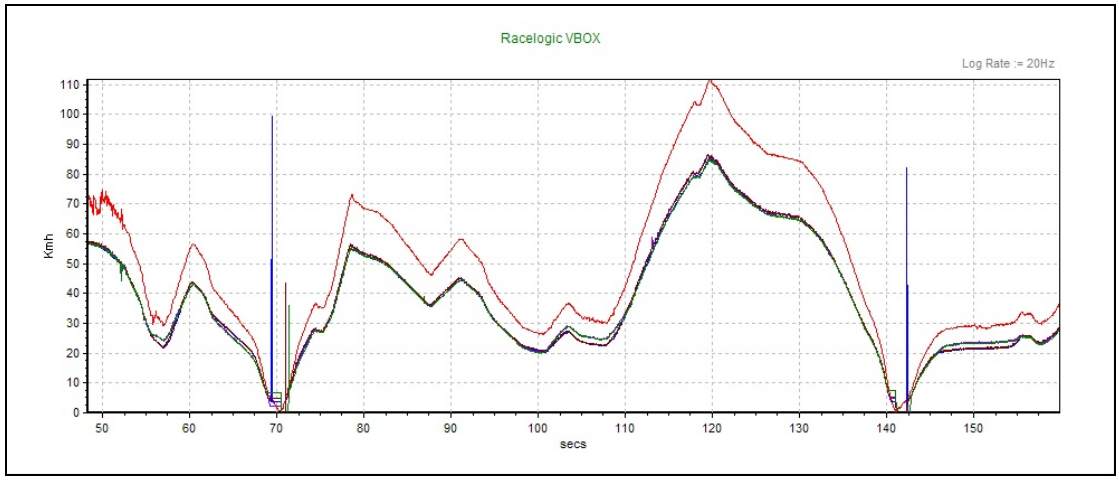
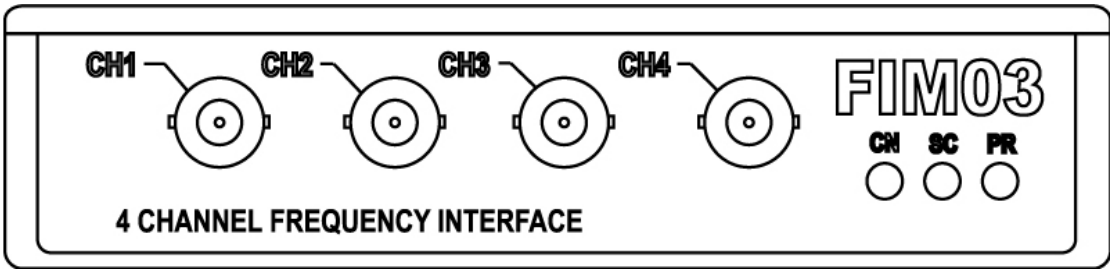


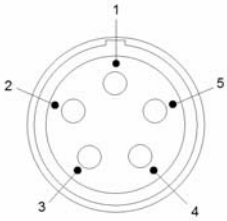
Fig. 13

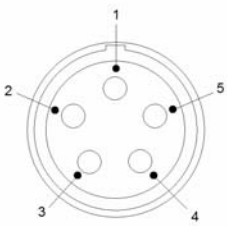
Connector Assignments

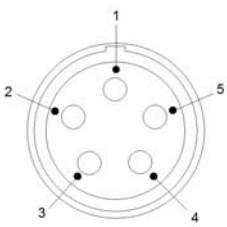


BNC Connections for Channels 1 to 4

Connection	Function
Centre Pin	Signal Input
Outer shield	Signal Ground

LEMO Connector 1 – CAN/POWER IN			
Pin	I/O	Function	
1	I/O	Direct connection to Connector 2 pin 1	
2	I/O	Direct connection to Connector 2 pin 2	
3	I/O	CAN High	
4	I/O	CAN Low	
5	I	+12 V Power	
Chassis		Ground	

LEMO Connector 2 – CAN OUT			
Pin	I/O	Function	
1	I/O	Direct connection to Connector 1 pin 1	
2	I/O	Direct connection to Connector 1 pin 2	
3	I/O	CAN High	
4	I/O	CAN Low	
5	O	+12 V Power	
Chassis		Ground	

LEMO Connector 3 – RS232			
Pin	I/O	Function	
1	O	TxD, Serial Data Transmit	
2	I	RxD, Serial Data Receive	
3	-	-	
4	-	-	
5	-	-	
Chassis		Ground	

Contact details

Racelogic Ltd
5 Little Balmer
Buckingham Ind Pk
Buckingham
MK18 1TF
ENGLAND

Tel +44 (1280) 823803

Fax +44 (1280) 823595

Email vbox@racelogic.co.uk

Web www.racelogic.co.uk

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1	First issue. CLS	15/04/05