

LabSat GNSS Simulators LabSat 3 Extensions Software

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01 - Extensions Introduction

LabSat 3 Extensions software offers the ability to display selected data directly from the LabSat 3 device. By utilising modules created for the Microsoft .Net framework. LabSat 3 Extensions software offers three modules; GNSS Monitor to display LabSat 3 NMEA messages, Video Sync to show VBOX video tightly aligned to the GNSS scenario replay and Serial Proxy for control of USB ports.

Other LabSat3 Extensions modules are available. For example LabSat 3 turntable software together with the turntable USB to CAN and Speed Pulse generator modules. Please contact LabSat directly or your local LabSat distributor for further information.



02 - Extensions GNSS Monitor

GNSS Monitor displays the NMEA Output from the internal GPS Receiver within LabSat 3. Connect the USB Port on the LabSat 3 to a spare USB Port on the PC. The GNSS data being replayed is then displayed on the GNSS Monitor, as seen below. When a dual constellation scenario is replayed, the GNSS monitor display can be changed by toggling between the pages of the LabSat 3 internal monitor.



LabSat 3 Extensions

Selected LabSat: Racelogic COM Port (COM49)

GNSS Monitor

Status:	Open	Speed:	083.4km/h
Sats in View:	10	Heading:	005°
Sats in Fix:	10	Latitude:	52°4'35"N
UTC:	14:29:50.50	Longitude:	1°1'18"W
Date:	6/27/2015	Altitude:	154.5m

50dB

20dB

GPS

150

100

50

0

14:27 14:28 14:28 14:29 14:29

Replay

Settings

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03 - Extensions Video Sync

The Video Sync is a powerful way of using a video recording of a live route to replay in synchronization with the LabSat 3 scenario file. To play a LabSat 3 scenario with the recorded video VBOX recording please tick the video sync tick box in the plug-in section of settings. The video sync drop down section will appear in the replay section of the software. Locate the LabSat file as normal and then locate the browse button in the video sync drop down menu.

Click on the vbo file located in the same folder as the video recording file. Wait for the file to load in the software and then press the play button as normal. The LabSat scenario file will then play in synchronization with the Video VBOX video. The user can enlarge the video replay screen to full screen by double clicking in the video window. Please ensure that the GNSS monitor is enabled and is showing the live data from the LabSat 3 scenario.



LabSat 3 Extensions

Selected LabSat: Racelogic COM Port (COM49)

GNSS Monitor

Status:	Open	Speed:	042.3km/h
Sats in View:	12	Heading:	149°
Sats in Fix:	05	Latitude:	51°59'32"N
UTC:	14:37:40.10	Longitude:	0°59'46"W
Date:	5/14/2014	Altitude:	113.5m

50dB

20dB

GPS

80

60

40

20

0

14:36 14:37 14:37 14:37 14:37 14:37

Video Sync

VVB VBO VBOX0010.vbo

Difference: 0.00s

Replay

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04 - Extensions Serial Proxy

This functionality allows the NMEA data from the LabSat 3 to be retransmitted on a USB port of the users' choice. The outputs baud rate is also user configurable. This functionality can be setup and configured in the settings page of the LabSat 3 Extensions software.



LabSat 3 Extensions

Selected LabSat: **Racelogic COM Port (COM49)**

GNSS Monitor

Status:	Open	Speed:	129.0km/h
Sats in View:	10	Heading:	162°
Sats in Fix:	10	Latitude:	52°4'27"N
UTC:	14:30:26.10	Longitude:	1°0'36"W
Date:	6/27/2015	Altitude:	157.6m

50dB

20dB

GPS

150

100

50

0

14:27 14:28 14:28 14:29 14:29 14:30

Serial Proxy

Port status: ● Open

Replay

Settings

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05 - Extensions CAN Output

The CAN Output feature enables the speed, heading, altitude or position data, calculated by the LabSat 3's internal GPS engine, to be output over a user defined CAN message.

This output CAN signal must be configured in the 'Signals' table, by clicking on the empty table input. This action will automatically populate the table with a default channel configurations, which will need to be adjusted to the users' specific requirements.

Further output CAN channels can be added by clicking the return key, when the last channel in the table is highlighted. Channels can also be deleted by pressing the Delete key.

CAN Output

USB Device

Refresh

Baud Rate

Signals

ID	Extended	Format	Type	Start	Length	Value	Scale	Offset	
	<input type="checkbox"/>								

Note: The Start and length inputs are in bytes, rather than bits.

To correctly output this configured message requires the USB device to be identified, and the baud rate determined.

The USB Device dropdown menu will identify any CAN enabled USB device that is connected to the users' PC and has



its own dedicated COM Port. If the device is not shown, use the refresh button to get the software to re-scan for CAN devices, or check your connection by using the PC's device manager.

The CAN communication baud rate (in kbits), is configured by selecting an option from the dropdown menu.

The following CAN Outputs can be selected from the value dropdown list:

- Speed – Km/h
- Heading – Degrees (°) with respect to due North
- Altitude – Height above mean sea level
- Latitude – Decimal degrees
- Latitude_Hemisphere – Degrees, Minutes, Seconds
- Longitude – Decimal degrees
- Longitude_Hemisphere – Degrees, Minutes, Seconds
- Time - UTC



06 - Extensions Speed Pulse

The Speed Pulse generator can be used to configure an output pulse from an RLLSMIM01 device that corresponds to the calculated distance travelled by the LabSat 3.

To create the output the user must use the dropdown menu to select the specific COM Port assigned to a RLCAB112, that is connected to the DATA2 port of the RLLSMIM01 module.

The required pulses per metre output should then be typed in to the text box.

Speed Pulse Generator

Serial Port

COM12



Pulses per metre

5.102



07 - Extensions Turntable Module

Note: Requires [LabSat Turntable Simulator](#).

To configure the turntable control system, the user must first fully connect up their turntable device, following the Labsat Turntable Solution setup diagram. This action should be carried out prior to running the LabSat software application. Once the software is running, the serial number of any USB connected Turntable device should automatically appear in the **Turntable** dropdown menu.

At this point, the communication between software and turntable device can be tested by pressing the **Test** button. The turntable should respond, performing a set manoeuvre. If there is no response by the system, all connections should be checked, and the software restarted.

NOTE: For Turntable connection and setup information see the [Turntable user manual](#).

Turntable Control (2.0.0)

Turntable	<input type="text"/>	<input type="button" value="Reset"/>
Ramp Rate	<input type="text" value="1000"/>	<input type="button" value="Home"/>
Min Speed (km/h)	<input type="text" value="4"/>	<input type="button" value="Test"/>
Orientation	<input checked="" type="radio"/> None <input type="radio"/> Automatic <input type="radio"/> Manual <input type="text" value="0"/>	



Orientation

Whist not controlled by a scenario, the turntable should be released, and free to move. If the turntable is still held by the software, the user can use the **Reset** button to 'free' it.

The **Home** button can be used to control and identify the current orientation of the turntable. If the button is pressed, the turntable will move to its due North position.

When a particular scenario is being replayed, the starting orientation of the turntable can be controlled by three options; none, automatic and manual.

The option **none** will leave the turntable in its current orientation when the scenario starts.

The **automatic** option will orientate the turntable to the direction of heading, derived from the first captured heading sample of the replayed scenario. This will occur instantly if a synchronously recorded Video VBOX VBO file is loaded, but will take up until the time taken for the GNSS monitor to capture its first true (i.e. not static) heading sample, if a scenario is replayed on its own.

The final option, **manual**, allows the user to input a chosen heading angle, of which the turntable will orientate to once the scenario replay starts. This angle is determined with respect to the turntables home position (due North).

User configurable Turntable Limitations

During the scenario replay, there are a couple of user configurable turntable limitations that can be set.

The **Min Speed** option can be used to set a speed (in km/h) for which the turntable will not respond to (i.e. speed = 2.5 km/h), if the replayed scenario speed is under this value. The default for this option is 4km/h.

A further option, **Ramp Rate** ($^{\circ}/s$), can be used to set the maximum acceleration and deceleration rate of the Turntable. The default for this option is $1000^{\circ}/s$.

