

MARELLI MOTORSPORT

SRG-141 TCR

GPS and beacon settings

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1. Introduction

Purpose of this document is to explain how to set up the TCR SRG141 ECU to cut the logged data using an external CAN GPS module as a beacon.

2. Requirements

- Sysma version minimum 1.49.06.30
- External GPS module transmitting the altitude and longitude coordinates by CAN to the SRG 141 TCR. Required format: in degrees with 7 decimals.

3. Steps to perform

• Update your project with a .clx map containing the received GPS coordinates by CAN (Latitude and Longitude signals).

To achieve this step, two solutions:

- Create two new measurement signals (Latitude and Longitude)
- import a corresponding .dbc into a .clx
- Add those two signals to your acquisition table .TPX/.TDX
- Set up the acquisition table properties.
- Check your ECU configuration
- Create the GPS POI (used to define the track line cutting your data)

4. Import the CAN GPS coordinates into your project

To use the beacon by GPS, the ECU SRG 141 TCR needs to receive the GPS coordinates (Latitude and Longitude) in degrees with 7 decimals. Eg: Lat 45.0000000° and Long 6.0000000°

You will need to import the received CAN coordinates into your Sysma project using two "CAN signals" contained in a .cxl, two solutions are offered to you:

- o Create two new CAN signals in an existing .clx
- import a .dbc file into a .clx



Both of these solutions are described in the <u>Getting Started Sysma</u> document in the part "9. CAN RX – HOW To create a generic measurement to read from CAN and Manual / Import DBC" and in the part "9.1 Manual / Import DBC"



Using these chapters you will get a .clx in your project containing the GPS coordinates received by CAN.

Example of a specific .clx containing the two CAN signals (Latitude and Longitude):



	1 🕺 🕫 🛅 🗎 1	e 🕂 🖊	🙎 🗷 强			B
Groups	Display Name	Dat	Output Format	Calib. Value	Decimals	Unit
Inassigned to Group	LAT	sLong	Dec		7	deg
Measurements	LONG	sLong	Dec	1444	7	deg
Calibrations	Hacc_GPS	uByte	Dec		2	m
Acquisition Lines	📘 Lap	uByte	Dec		0	
CAN Signals	Nav_Status	uByte	Dec	1.777	0	
RX Messages	📋 NSat	uByte	Dec		0	
5571	·	-	-		100	

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5. Add the CAN GPS coordinates in your table properties

Once you have imported the Latitude and the Longitude signals to your project, as CAN signals in a .clx, you can import them in your acquisition table .TPX or .TDX.

To proceed, open your acquisition table and then add the GPS coordinates signals inside.

You can drag and drop them from the .clx

1	-			. n n.	1704 (2 .				an Ar an
			u 👛 🔑 u	# 9K 91*	Ga <mark>fin</mark>				
Channels	Display Name 🔺	Unit	Data Type	Format	Decimals	Frequency A	Elaboration	Comment	Compute Frequenc
😜 RealTime	KnKNoise2		Float	Dec	3	1000Hz	Line	Gain factor for knock detection cyli	
🕌 Groups	KnKNoise3		Float	Dec	3	1000Hz	Line	Gain factor for knock detection cyli	
- 🖸 Zeros	KnKNoise4		Float	Dec	3	1000Hz	Line	Gain factor for knock detection cyli	
Sensor Calibration	KnMild		uByte	Hex	0	1000Hz	Knock mild level detected		
Trigger	KnNoiseMin1	mV	Float	Dec	0	1000Hz	Line	Minimum noise clamp level cylinde	
A Partial Time	KnNoiseMin2	mV	Float	Dec	0	1000Hz	Line	Minimum noise clamp level cylinde	
RX Messages	KnNoiseMin3	mV	Float	Dec	0	1000Hz	Line	Minimum noise clamp level cylinde	
TX Messages	KnNoiseMin4	mV	Float	Dec	0	1000Hz	Line	Minimum noise clamp level cylinde	
• TA Messages	KnStrong		uByte	Hex	0	1000Hz	Line	Knock strong level detected	
	Lambda1Diag		uByte	Hex	0	1000Hz	Line	Lambda 1 diagnostic	
	Lambda1Lambda	lambda	sWord	Dec	3	1000Hz	Line	Lambda 1 in lambda	
	Lambda1Out	f(select	. sWord	Dec	3	1000Hz	Line	Lambda 1 value for regulation	
	Lambda1Temp	°C	sWord	Dec	0	1000Hz	Line	Lambda 1 temperature	
	LambdaTqt		Float	Dec	3	1000Hz	Line	Lambda target	
	LAT	deg	sLong	Dec	7	1000Hz	Line		
	Launch_On		uByte	Dec	0	1000Hz	Line	Launch system engaged	
	LaunchActive		uByte	Dec	0	1000Hz	Line	LaunchActive	
	LaunchEnable		uByte	Dec	0	1000Hz	Line	Launch enable	
	LaunchLimiter	rpm	uWord	Dec	0	1000Hz	Line	Launch Limiter	
	LaunchRequest	82	uByte	Dec	0	1000Hz	Line	Launch request	
	LbdError_1		Float	Dec	3	1000Hz	Line	Lambda regulation error 1	
	LbdRegulEna 1		uByte	Dec	0	1000Hz	Line	Lambda regulation enable 1	
	LONG	deq	sLong	Dec	7	1000Hz	Line		
	MAPsel		uWord	Dec	0	1000Hz	Line	Map selection	

Once added, open your table properties, using the specific button -> Logger Table Properties

	8 8 2 🗖 🕤	96		* S< O+	at 👫	
Channels	Display Name 🔺	Unit	Data Type	Format	Decimals	Frequenc
🕹 🔑 RealTime	aCam1_Angle	°crk °crk	uLong	Dec	2	1000Hz
🕀 🦛 Groups	aCam1_Shift		sLong	Dec	2	1000Hz
Zeros	aCam <u>1_State</u>		uByte	Dec	0	1000Hz
Sensor Calibration	aC Table Prope	rties				
Partial Time	aC Comment					
RX Messages	Ac					

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The window below will open, you need to fill the GPS position fields with the Latitude and the Longitude signals.

evel channel Channel :	M SS mmm	Distance Settings Mode: • External signal	Channel :
ap Type Definition Channel :	OUT lap threshold (m)	C Speed Channel C Input capture channels	DistanceLap
'artial Time Channel Channel :	[%] B Frequency	Logger Data TX Frequency Mode:	Track Lap Indexing Channel:
ap Trigger Inhibition Time		GPS position Latitude: LAT Longitude:	Track Run Indexing Channel

Once done, you can save the changes done to your acquisition table and send it to your ECU.



6. ECU map setting

By default in the TCR project, the setting for the beacon is to cut the lap using these GPS coordinates: The calibration "Beacon input selection" has to be set to "GPS" as below:

Display Name:	Beacon input selection	Size X,Y,Z:	[1,1,1]	BP X:	(1)	-	Start Addr.:	3100C015	Start:	GPS	
Reference Name:	SYSeeTIm.BeaconSelection	Unit:		BP Y:	(1)	-	Curr. Addr.:	3100C015	Actual:	GPS	
Box-Unit:	SRG->EEP	Data Type:	BYTE	BP Z:	(1)	-	Conversion:	1,0,0,1,1	Diff.:	0.000	0.000%
1,1,1	1										
0.000	-										

With this calibration set to "GPS", the logged data will be cut each time the car will cross the virtual track line defined by the GPS POI contrained in your SRG 141 TCR (how to set up the GPS POI is described hereafter).



7. How to set up your GPS POI.

You need to browse your ECU alias in the SRG_GPS module as below:





Then double click on the "Module Configuration" button, the flowing window will open.

<u>Eile E</u> dit <u>L</u> ink							Etherne
1 0 4 5 6 4	🔰 🖻 🗙 🕾 💿 🕱 🗙						
POI (Points Of Interest)	PC Archive:				GPS Module Files:		
File Name 🔺	Comment	Date	Used File Trace	To GPS	POI Files	Date	Show GPS Files
POI Name:	Biowse Rime	sort 💽 Export		4	Status: Connected to GPS	Date	Delete All
Circak	Select Lap times Jee Best Lap after power OFF Jee latest Best Lap it LAP TIME is identical	A					
			$\left \Theta_{i_{k}} \Theta_{i_{k}} \Phi_{i_{k}} \right \not \underline{D}'_{i}$				

On the right top corner, you can link to your ECU:



Clicking on "show GPS Files" will display the list of the GPS POIs which are already inside your ECU, be careful to not have two GPS POIs too close to each other.



On the left top corner you can create a new POI (File -> New) and insert its name.

Vame 🔺	Comment	Date	Used File Trace	
	💋 Boows	e 🔀 Import 🔀	Export	
ame:	Trace Name:			
lame:	Trace Name:	New Poi	X	Ŋ
lame: nent: ırmat: ddd*mm'ss.ss''	Trace Name:	New Poi POI File Name: Tra	ackLine	



When the POI has been created, you can select it and then modify it.

POI Name: Tr	ackLine	Trace Na	ame:					
Comment:								
GPS Format: 🚺	ld.dddddd* 🚽 💌]	lcon Not Set	S	elect			
⊂Type	Use Be	ist Lap times est Lap after power est Best Lap if LAP	OFF TIME is identio	cal				
Туре	Lat	Long	Distance (m)	Split Sv	Line Dv	Unidirectional	REF.TIME	
Finish Line	45.0000000	6.0000000	0	8	8	~	0:00:000	

It's suggested to use GPS Format ddd.dddddd° (just copy and paste the coordinates from Google Earth).

After having selected your desired line GPS coordinates, you can fill directly the centre point and then the Sx and Dx parameters which are the distance in meters from this center point).

Be care to have the GPS POI arrow (in green) in the same direction than the car crossing the line.



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-		1	Custom POI Edit (Finish Li	ine)	Turset		Status: Connected to GPS Mod
POI N Comr GPS Fo - Type © C	lame: TrackLin ment: ormat: ddd*mm* Circuit `Track	ss.ss'' 💌	Center point	Long: 6* 0' 0.00''	C Right/Left point — Left Point ← Lat: 45° 0° 0.26° — Right Point ← Lat: 44° 59' 59.74°	Long: [6° 0' 0.00'' Long: [6° 0' 0.00''	
ype Line	Lat 45° 0' 0.00''	Long 6* 0' 0.00''	0 8 8	0:00:000		Cancel	

Another option is to click on the "..." button (see image below).

Here, it is possible to change the position of a POI by modifying the coordinates of the central node or also by modifying the positions of the right and left nodes. If the positions of the right and left node are entered, the center node will be automatically calculated.

Once satisfied by your settings, you can save your POI and send it to the ECU.

Select the POIs that you want to have internally to your ECU and then click on the "To GPS" button to trasmit them.

OI (Points Of Interest) P	C Archive:			GPS Module	Files:	
File Name 🔺	Comment	Date	Used File Trace	POI Files	⊾ Date	
TrackLine		20/02/20		TrackLine	20/02/20	💕 Link
				To GPS		L
				utp		Show GPS Files
				To PC		Download All
				Trace File	Date	Delete All
	🟉 Browse	Import Resport		Status: Conne	cted to GPS Module (192.168.1.	254)

You can also download the internal POIs from your ECU to your laptop using the "To PC" button.

8. Conclusion

After correctly following all these steps, the logged data in your ECU will be automatically split each times the car will cross the virtual line defined by the GPS POI.