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# Toucan Touchscreen Gauge and Trim/Compensation Selection Unit
# User Guide V1.81 (Link & Vi-PEC)

Firmware Versions 1.80 and above

**Disclaimer**

Although every care is taken with the design of this product, JT Innovations Ltd. can in no way be held responsible for any consequential damage resulting from the use of Toucan in your vehicle.

Always operate your vehicle safely and do not allow yourself to be distracted by your Toucan display while driving. Minimise the amount of time you spend viewing the screen. Do not access any function requiring prolonged use of the menus whilst driving.

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# Contents


Toucan Touchscreen Gauge and Trim/Compensation Selection Unit ..... 1
User Guide V1.8 (Link & Vi-PEC) ..... 1
Introduction ..... 3
Installation ..... 3
Before You Start ..... 3
Installation ..... 3
Connectors ..... 3
Power ..... 4
Multiway Connector ..... 4
In-vehicle Mounting ..... 4
Data Connection 6-pin CAN-F Data Connector ..... 5
Link/Vi-PEC Configuration ..... 6
Link G4/G4+ Mode ..... 7
Link/Vi-PEC DI Control Functions ..... 7
ECU Configuration - Launch Control 8
ECU Configuration – ALS on/off ..... 9
ECU Configuration –DI functions for CALs ..... 10
ECU Configuration –Anti-Theft ..... 10
Menus and Operation ..... 11
Gauge Screens ..... 11
Large Gauges ..... 11
Settings Menu ..... 12
Setup Menu ..... 12
Gauge Layout ..... 13
CAL Selection Menu ..... 13
Editing CAL Text ..... 13
CAL PIN Protection ..... 14
Alarm Configuration ..... 15
Available Alarms ..... 16
"More" Menus ..... 17
CANbus Termination ..... 17
Other Functionality ..... 18
Sensor Errors and Limit Flags ..... 18
Knock Level and Injector Duty – Realtime Display ..... 18
Limit Indicators ..... 18
Firmware Updates ..... 18
Technical ..... 19
Glossary ..... 19




# Technical

| | |
|---|---|
| **Data Interface** | CAN 2.0B at 1Mbit/s or 500kbit/s with selectable termination, or RS232 at 9600 baud or 115.2kbaud |
| **Expansion Connector** | RS232, CAN, Power Out and Ground. Allows connection of toucan expansion accessories, available in 2012. |
| **Power** | 8-20V <200mA typ.<br><40mA in standby mode<br>Connections to permanent, switched and illumination power, via 1A fused connections. |
| **Memory** | Non-volatile storage of all parameters |
| **Firmware Updates** | Via rear-panel USB connector, using PC programme. |
| **Compliance** | Directives: 2002/96/EC, 72/245/EC, EN50498:2010 |
| **Warranty** | 1 year |
| **Dimensions** | 100x83x16mm |
| **Weight** | 200g |
| **Display** | 3.5" QVGA TFT, 320x240 pixels, 24 bit colour, with touchscreen |
| **Processing system.** | 190MHz 32 bit ARM9, 8Mbytes Flash memory, 8Mbytes SDRAM. |
| **Package contents** | Toucan unit, power/data cable harness, mount, installation guide. |
| **Available Gauges/Alarms** | Air intake temperature; Battery Volts; Boost (2.5 bar and 3.5 bar); Exhaust Gas Temperature (2 channels); Fuel level; Fuel Pressure; Fuel Temperature; Current Gear; Injector Duty warning; Knock; Lambda (2xwideband channels, 1x narrowband); Lean Lambda warning; Engine limp/Cut mode; MAP; Oil Pressure; Oil Temperature; RPM; Sensor Error; Throttle Position; Coolant Temperature; Wheel Speed. |

# Glossary

| Term | Description |
|---|---|
| **ACT** | Air Charge Temperature |
| **CANbus** | "Controller Area Network" bus – a serial interconnect common in vehicles. |
| **ECT** | Engine Coolant Temperature |
| **EGT** | Exhaust Gas Temperature |
| **EOP** | Engine Oil Pressure |
| **EOT** | Engine Oil Temperature |
| **FP** | Fuel Pressure |
| **MAP** | Manifold Absolute Pressure – the air pressure in the manifold, atmospheric pressure is 1bar, total vacuum is 0bar. |
| **TPS** | Throttle Position Sensor |

## Other Functionality

### Sensor Errors and Limit Flags

The ECU datastream includes a number of error, status and limit flags that can be decoded and displayed on Toucan.

If the sensor alarm is enabled, any such status message will cause a small “sensor alarm” icon to be displayed in the main gauge screen. If the sensor alarm large gauge is enabled, a large alarm indicator will be shown, and this then shows the error number and the decoded message.

You may need to refer to Link/Vi-PEC documentation for a detailed explanation of any error message.

### Knock Level and Injector Duty – Realtime Display

If enabled as large gauges, the full screen knock level and injector duty “gauges” will show a realtime display of the knock level and injector duty.

### Limit Indicators

There are two indicators that can be added to the main gauge pages, via the gauge setup menus. These show “RPM Limit” and “MAP Limit”.

For these to be displayed: go to Settings | Setup | Gauge Setup. From there you may change either or both of the tiniest gauges to be “Status 1” or “Status 2” – these are RPM and MAP respectively. This can be done on any or all gauge pages, as wished.

## Firmware Updates

Occasional firmware updates will be made available to add new features. These may be downloaded from the Downloads section of the JT Innovations website.

Updates are applied using a PC program (also available from the website) and a standard “mini” USB cable. Updates should be applied with the Toucan disconnected from the vehicle. It will be powered from the PC USB port, although the LCD will be shut down.



## Introduction

Thank you for purchasing a Toucan display. We hope it will be easy to install and configure, and we recommend you read this guide before you start. It is recommended that you register your product in the JT Innovations website – this way we can keep you advised of any product updates etc.

## Installation

### Before You Start

Please check the box contents to ensure nothing is missing. You should have:

***toucan Unit***



***Cable Harness***



***Mount (one of the following)***



### Installation

#### Connectors



| | |
|---|---|
| 6 pin “CAN-F” | Data connection to Link/Vi-PEC ecu |
| BLACK | Power Ground |
| YELLOW | Permanent +12V |
| RED | Switched +12V |
| ORANGE | Lighting circuit |
| Multiway | Connects to Toucan unit |

***ENSURE THE CAR BATTERY IS DISCONNECTED BEFORE ATTEMPTING TO INSTALL YOUR TOUCAN DISPLAY UNIT***

***IF IN DOUBT, PLEASE CONSULT A QUALIFIED AUTOMOTIVE ELECTRICIAN***

## Power

The power connectors are provided with "bullet" connectors which may be removed if preferred. Each power feed has an inline fuse holder pre-fitted with a 1 amp 20mm glass fuse. Ensure a good ground connection is provided to the BLACK wire.

To allow Toucan to power up quickly, it is recommended that a connection to both a permanent and switched (i.e. only live when the ignition is on) vehicle battery feed are made. When the ignition is off, Toucan will consume about 40 milliamps from the permanent connection – a typical, healthy, 40 amp-hour vehicle battery will last over a month before being run completely flat by Toucan: but it's your choice.

If you decide not to connect the YELLOW permanent +12 Volt, please make sure it is wired along with the RED connection to the switched ignition feed; otherwise Toucan may not start up when you turn on the ignition.

Toucan will take about 6 seconds to start if the permanent +12 Volt feed is not connected compared to less than a second when the permanent connection is made.

A connection to the vehicle lighting circuit may be made using the ORANGE connector – this will allow the Toucan unit to automatically dim when the vehicle lights are turned on. If not required, please insulate the unused wire to prevent damage to the unit or vehicle.

## Multiway Connector

This connects to the rear of the Toucan unit. Note that it has a latching tab that must be depressed before the connector and cable can be detached.

The connector is intended to allow occasional removal of the unit from the car to allow, for example, firmware updates to be applied.



***When detaching the unit, take care not to put unnecessary strain on the wires otherwise they may be damaged.***

## In-vehicle Mounting

Toucan uses the Herbert Richter™ 4-prong mount system, which provides a secure mount when in the vehicle, but easy removal should it be required.

The default mount supplied is a permanent mount which is intended to be permanently screwed to the vehicle. Make sure the mount is in the location you require before attaching it!

An alternative mount may have been supplied as a choice when you purchased your unit, or they may be purchased separately if required: please contact JT Innovations for availability.





## "More" Menus

The more menus allow you to select

- Units used – Metric, Imperial or "USA" (which uses Imperial measurements for everything except Boost and MAP which are in kPa)
- Speed display – mph or kph
- Gear display – H pattern or digits
- Whether the large full screen gauge should be automatically displayed should the gauge start showing an alarm
- Whether changing the CAL should be PIN protected – either all of them, or just the last CAL.
- Change the CAL PIN
- Select Absolute or Relative Fuel Pressure (Relative only available if CAN bus or custom serial data selected).
- Enable/Disable the display of peak markers on gauges. Peaks are remembered until manually reset on the large gauge display.
- Enable/disable dynamic peak markers. Dynamic peak markers maintain the current peak for just a few seconds and then drop back to the current reading. The hold period can be adjusted.
- Choose the ECU interface (STACK, CAN or Syvecs customer serial data)
- Choose the CAN data rate (1Mbit or 500kbit)
- Edit Digital Inputs (DIs) sent for CALs 1 to 8, launch control, and antilag control
- Choose between Link G4 and G4+ models.
- Mute alarms if the engine is not running - useful if the vehicle is not being driven, but the ignition is switched on.
- Turn the audible touchscreen feedback beep on/off
- Determine which large gauges will be displayed when you cycle through them. This is useful to hide gauges when the appropriate gauge sensor hasn't been fitted.
- Display CAN termination on/off, software version and current/actual CAL voltage

## CANbus Termination

It may be necessary to enable the bus termination if Toucan is the last device on the CANbus network. By default the termination is switched off, but it may be enabled by sliding the small switch on the rear of the unit towards the 4-prong mounting plate. You may need to use a small screwdriver to access the switch through the rear cover.

You can confirm the status of the termination switch via the "more" menus.

## Available Alarms

- ACT. Any value in range, in 1°C steps. Alarm triggered if alarm value is exceeded. Default 50C.
- Battery voltage. Any value in range in 0.25V steps. Alarm triggered if current value is below alarm threshold. Default 11.5V
- Boost. Any value from 0 to max, in 0.05 bar increments. Alarm triggered if alarm value is exceeded. Default 1.5bar.
- Coolant temperature. Any value in range in 1°C steps. Alarm triggered if alarm value is exceeded. Default 95C.
- Exhaust Temperature (EGT1 and EGT2). Any value in range in 10°C steps. Alarm triggered if current value is above alarm threshold. Default 850C.
- Fuel Level Low. 0-100% in 1% increments. Alarm is triggered if current level is below the alarm value, default 10%.
- Fuel Pressure. Any value in range in 0.1bar steps. Alarm triggered if current value is below alarm threshold. Default 2 bar.
- Fuel Temperature. Any value in range in 1°C steps. Alarm triggered if current value is above alarm threshold. Default 70C.
- Injector Duty Cycle. Any value up to 100% in 1% steps, default 85%. Alarm triggered if injector duty cycle exceeds the alarm threshold.
- Knock detected.
- Lambda 1 and Lambda 2. Any value in range, in 0.01 steps. Alarm triggered if alarm value is exceeded. Default 1.05.
- "Lean Lambda". Alarm is triggered if lambda exceeds set value AND RPM is above set value AND Boost exceeds set value.
- Boost. Any value in 0.05 bar increments. Alarm is triggered if alarm value is exceeded. Default 2.5bar
- Oil Pressure. Any value in range in 0.1bar steps. Alarm triggered if current value is below alarm threshold. Default 2 bar.
- Oil Temperature. Any value in range in 1°C steps. Alarm triggered if alarm value is exceeded. Default 120C.
- Oil Temperature Low. Any value in range in 1°C steps. Alarm triggered if current value is below alarm threshold. Default 70C.
- RPM. Any value in range 0-10,000 rpm in 100rpm steps. Alarm triggered if alarm value is exceeded. Default 7500.
- Sensor Alarms. Any sensor in a fault state will cause an alarm.
- TPS. Any value 0-100%, 5% steps. Alarm triggered if alarm value is exceeded. Default 50%.
- Wheel speed. Any value in range in 1mph or 1kph steps. Alarm triggered if alarm value is exceeded. Default 70mph/120km/h



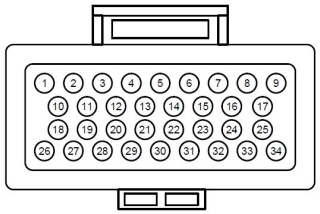
toucan JT innovations

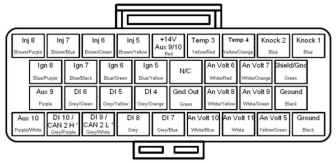
## Data Connection 6-pin CAN-F Data Connector

Depending on the ECU variant, the cable you will either use the 6 pin "CANF" connector, or will need a pair of pins to insert into the main ECU header.

***NOTE: the CAN connector is NOT the same as that used to map the ECU. It is identical looking, but plugs in to a second header on the ECU board: the necessary cable can be obtained from your mapper/installer, a Link/Vi-PEC dealer or from JT Innovations.***

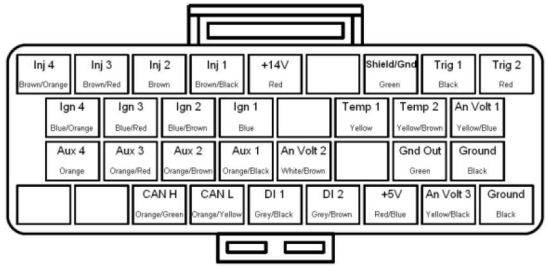
- All G4, G4+ except the Atom, and all V- and i-series ECUs have the 6 pin connector
- G4+ Xtreme and i88 with PCB version 1.4 and newer also have a second CAN interface on the main ECU connector as follows, looking at the rear of the loom plug, as if looking in to the ECU itself:



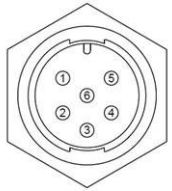


- G4+ Atom only has CANbus on the main ECU connector as follows, looking at the rear of the loom plug, as if looking in to the ECU itself:






- Cut the CAN-F connector off and the SuperSeal pins then need to be inserted in to the correct pin location as above:
  - CAN HI is the BLACK wire of the Toucan cable
  - CAN LO is WHITE wire of the Toucan cable




Looking into ECU connector

The 6 pin CANF connector plugs directly in to the Link/Vi-PEC ecu. For reference:

- Pin 3 is CAN H
- Pin 4 is CAN L.

## Link/Vi-PEC Configuration

Having checked the installation of your Toucan, ensuring all connectors are fully home and especially that the power wiring is correct, reconnect the vehicle battery and turn on the ignition. After a few seconds, Toucan should power up and display the main gauge screen. Before it can display any gauges, the ECU must be configured correctly.

Toucan is capable of receiving runtime parameters and status information from Link and Vi-PEC ECUs. Toucan is also capable of activating CAN Digital Input (DI) channels 1 to 8 on Link G4+ and Vi-PEC i-series ECUs.

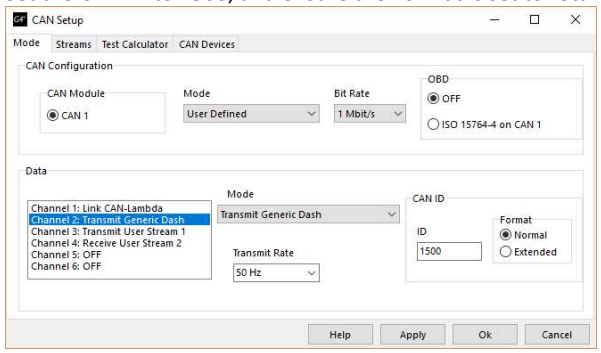
***G4 and V-series ECUs with a serial number lower than 10,000 will need a CAN upgrade performed before they can communicate with CAN devices. Consult your dealer.***

To control DI channels you will need to download “Toucan CAN Extra Frame V180 onward.lcs” and “Toucan CAN DI V180 onward.lcs” from the JTi website (www.jti.uk.com/downloads). Place these file in the Link PCLink G4+ installation folder named “CAN” – this is usually located at “C:\Link G4\PCLink G4+\CAN”.

You must also use PCLink or iVTS version 5.1.0 or newer. If necessary download the latest version from the Link/Vi-PEC website.

Configured your system as follows using PClink or iVTS as appropriate:

1. Open the CAN Setup window: ECU Controls | CAN Setup
2. Select the CAN module to be used
3. Set the Mode to 'User Defined'.
4. Configure the Bit Rate to 1 Mbit/s
5. Select a spare CAN channel.
6. Select 'Transmit Generic Dash' from the Mode drop-down menu.
7. Set the Transmit Rate to 20 Hz.
8. Set the CAN ID to 1500, and ensure the Format is set to “Standard”








## Alarm Configuration

The Alarms configuration menu allows you to determine which parameters will cause alarm events. A setting allows the audible alarm to be muted if the engine is not running.

An alarm event will:

- Cause an audible warning, unless Toucan is muted
- Cause the bezel of the relevant gauge to change to a flashing orange
- If enabled, cause the relevant gauge to be displayed full screen.

In addition, there is a low oil temperature warning that can be enabled. This will not sound the audible alarm, but will display a non-flashing orange bezel until the oil temperature exceeds the configured temperature. Obviously this function only works if an oil temperature sensor is connected to your ECU.

When an alarm is activated, the relevant large gauge has a mute button. This may be used to temporarily mute that specific alarm. It will remain muted until either that alarm condition clears or Toucan is repowered. Alarms for other fault conditions will not be supressed or muted.

## CAL PIN Protection.

If enabled via the “more” menus, Toucan can be set to prevent the current CAL being changed unless you enter a 4-digit PIN. This can be useful if you have a “valet” mode (with reduced rpm limit for example) and/or an anti-theft CAL. You can also set PIN protection to *only* apply to the last CAL (i.e. CAL 8), *only* to the first CAL or to *both* the first and last CAL.

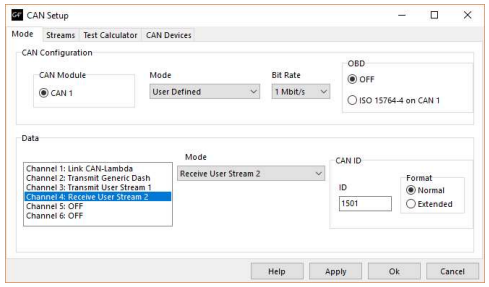
There are a few things to be aware of if you choose to use this option:

- The default PIN is 0000 and it is recommended that you change this to something else.
- Once PIN protection is enabled, the (correct) PIN will need to be entered before you can change the PIN, or to disable PIN protection again.
- If the PIN is entered incorrectly 3 times, PIN entry will be prevented for the next 10 minutes. Note that this 10-minute timeout will be reset if power is removed from the unit.
- In the event that Toucan is disconnected from the Syvecs ecu, the ecu will, in most cases default to CAL 8 (although this can be CAL 1 if a Syvecs input with no pull-up resistor is used). It is generally recommended that the valet or anti-theft CAL is in position 8, or the PIN protect first CAL function (or first *and* last) is used.
- In the event that you forget the PIN it can be reset using a PC programme, connecting to Toucan via USB. This programme is available from the JT Innovations website, or contact technical support for assistance.






9. Select the next spare CAN Channel.
10. Select ‘Transmit User Stream **X**’ from the Mode drop-down menu (where ‘**X’** is the next unused transmit or receive user stream number.
11. Set the CAN ID also to 1500, transmit rate to 20Hz, and ensure the format is set to “Standard”.
12. Select 'Receive User Stream **Y**' from the Mode drop-down menu (Where ‘Y’ is the next unused transmit or receive user stream number).
13. Set the CAN ID to 1501.
14. Ensure the Format is set to “Standard




15. Change to the Streams tab of the CAN Setup window. Select Stream **X** – where “X**”** is the stream selected above - and then click Load Stream.
16. Select ‘Toucan CAN Extra Frame V180 onward.lcs’ and click the Open button.
17. Select Stream **Y** (where “**Y”** is as selected above) and then click Load Stream.
18. Select ‘Toucan CAN DI V180 onward.lcs’ and click the Open button.
19. Make sure no other CAN channels are configured on the same CAN IDs.
20. Click Apply and then OK.
21. Make sure a Store (F4) is performed.

## Link G4/G4+ Mode

Use “More” menu 4 to choose between G4 and G4+ modes – this is important to correctly display lambda values received as they differ between the models. Also note that the G4 does *not* support DI control. Use G4+ for Vi-PEC i-series models and G4 for Vi-PEC V-series models.

## Link/Vi-PEC DI Control Functions

Link G4+ and Vi-PEC i-series ECUs allow a wide range of parameters to be controlled via a CANbus message that acts as a “Digital Input”. This includes functions such as launch control on/off, anti-lag on/off, fuel table switching, boost limit switching, etc.

Toucan has dedicated touch controls for launch control and antilag activation. In addition it provides 8 “Calibration” (“CAL”) selections that can be used to control any combination of the 8 DI channels available from Toucan.

To make use of these functions, User Inputs must be configured using the Link/Vi-PEC Ecu Manager software to correctly assign functions to the relevant DI channel(s).

### *Toucan Configuration*




This is accessed via the "More" menus on page 4.

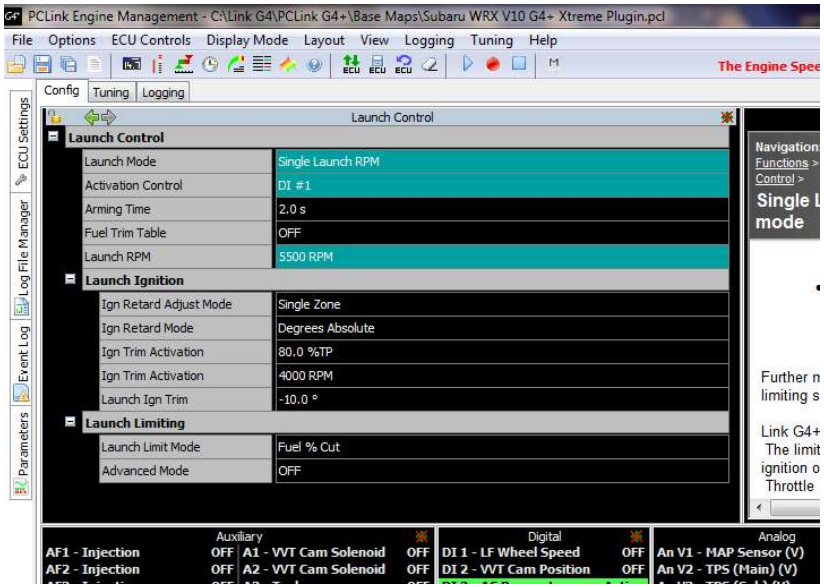
A grid of all 8 available DI channels against the 8 "CALs", plus the launch and antilag button functions is presented. You now select the required DI's to be transmitted for each of these functions. CALs have User text that may be used to describe the function of each Cal (see later).

## ECU Configuration - Launch Control

You may wish to consult with your mapper before configuring Launch Control.

To allow Toucan to turn launch control on or off:

- Go to "ECU Settings | MotorSport | Launch Control
- Set the Launch Mode to any mode but "OFF"
- Set Activation Control to the required DI (e.g. CAN DI #1 – Note: *not* "DI #1"; it must be "CAN DI #1")







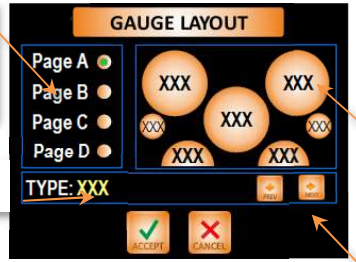

## Gauge Layout

This is accessed via the Gauge Setup button, and then "Gauge Select".



Touch here to select which of the 4 pages to setup

Gauge name is shown



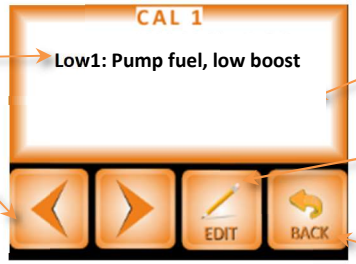

Touch the gauge that you wish to change. A 3 letter mnemonic describes the current gauge selected for each position

Touch here cycle between the next and previous gauges in the list

## CAL Selection Menu

First 5 characters of this text used on main gauge screen as label.

Next and previous buttons to select a different setting




User Text describing this calibration function

Touch here to edit the User Text

Touch here to return to previous menu

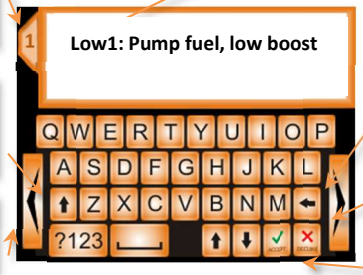
## Editing CAL Text

First 5 characters used as label on main screen

The text being edited.

Shift key to access lower case characters, symbols, etc.

Next and previous buttons to select a different CAL




Backspace (delete character to left)

Move the cursor up or down the 3 lines of text

Touch here to return accept or

## Settings Menu




Touch here to select full brightness

Touch here to dim display to night brightness. Touch and hold to display a dimmed screensaver with no gauge activity, useful when the screen could be distracting.

Touch here to enter SETUP menus

Touch here to mute or unmute audible alarms.

Touch here to change current calibration

Touch here to return to gauge screen

If the "illumination" wire has been wired to the vehicle's lighting circuit, the manual day and night buttons will temporarily override the brightness as controlled from the vehicle lighting stalk.

## Setup Menu




Touch here to adjust night brightness level

Not applicable to the Link/Vi-PEC ecus.

Touch here to choose gauge layout and colour scheme

Touch here to configure alarms.

Touch here for more menus

Touch here to return to settings menu



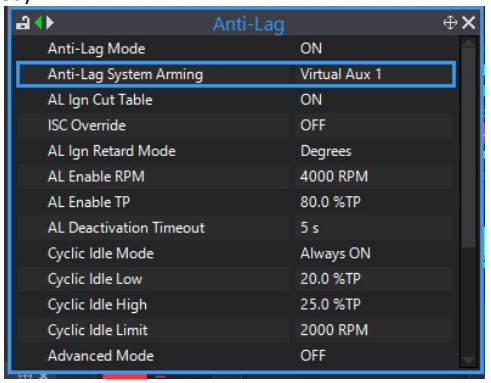


## ECU Configuration – ALS on/off

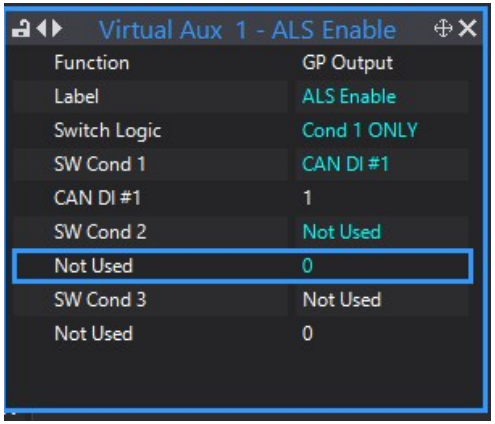
You may wish to consult with your mapper before configuring AntiLag.

To allow Toucan to turn ALS on or off:

- Go to "ECU Settings | MotorSport | Anti-Lag"
- Set the Launch Mode to "ON"
- Set the Anti-Lag System Arming to "Virtual Aux 1" (Virtual Aux 2 or 3 can be used instead if preferred).




- Go to "ECU Settings | Auxiliary Outputs | Virtual Aux 1"
- Set the Mode to "GP Output", Switch Logic to "Cond 1 Only". Give it title, such as "ALS Enable"
- Set Sw Cond 1 to required CAN DI (e.g. CAN DI #1 – Note: *not* "DI #1"; it must be "CAN DI #1")
- Set the parameter now labelled with the CAN DI chosen to be "=1".



### ECU Configuration –CAN DI functions for CALs

You may wish to consult with your mapper before configuring other functions to CAN DIs (Note: *not* “DIs”; it must be “CAN DI”s).

First, consider what functions you wish to have on each of the 8 CALs. Typical usage might be low and high boost settings, and fuel/ignition tables for different fuel types. As an example, this could be set as follows:

- Go to “ECU Settings | Boost Control | Multiple Boost Tables
- Set the Active tables to “2 tables” or “3 tables” as required
- Set Activation Control to the required CAN DI (e.g. CAN DI 3 and 4)
- Go to “ECU Settings | Fuel | Fuel Corrections | Dual Fuel Table
- Set any mode other than “OFF”
- Set Activation Control to the required CAN DI (e.g. CAN DI 5)
- Go to “ECU Settings | Ignition | Ignition Corrections | Dual Ign Table
- Set any mode other than “OFF”
- Set Activation Control to the required CAN DI (e.g. CAN DI 7)

For the purposes of illustration, let’s assume:

- Boost table 1 is low boost (default)
- Boost table 2 is high boost (activated by CAN DI3)
- Pump fuel is fuel table 1 (default)
- Race fuel is fuel table 2 (activated by CAN DI5) and this needs ignition table 2 on CAN DI7

In reality other tables, such may need to be configured too. However, as an example, Toucan could now be set up as follows:

- CAL1: no CAN DIs controlled - low boost, ignition table 1 and pump fuel.
- CAL2: trigger CAN DI3. This would be high boost and pump fuel
- CAL3: trigger CAN DI5 and 7. This would be low boost and race fuel
- CAL4: trigger CAN DI3, 5 and 7. This would be high boost and race fuel.

### ECU Configuration –Anti-Theft

Toucan allows “CAL 9” to be used to enable an immobiliser/anti-theft function. In combination with requiring a PIN to change to or from the last CAL (CAL 9 in this case) this can be a useful additional level of security.

To enable this function, you must have configured the “Toucan CAN DI V180 onward.lcs” datastream as described earlier :

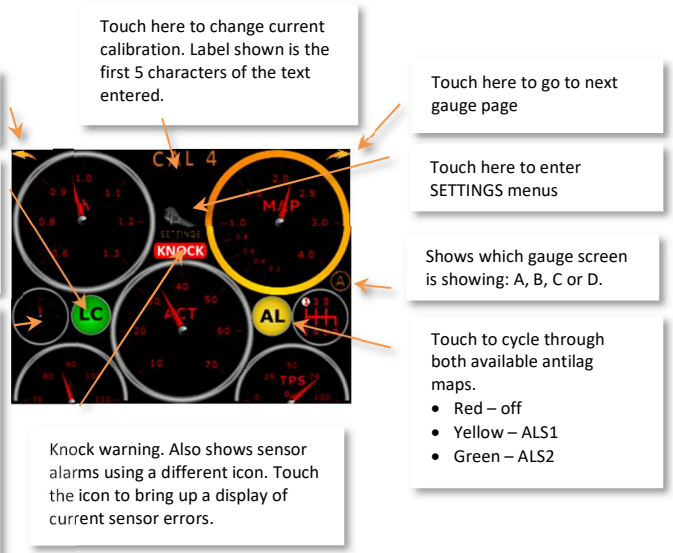
- Go to “ECU Settings | Chassis and Body | Anti Theft”
- Set “Allow CAN Anti-Theft Request” to “Yes”
- Set the “CAN Anti-Theft Default State” to “Immobilised”





## Menus and Operation

### Gauge Screens




Four gauge screens are available with complete flexibility of which gauge is displayed where. This can be configured via the Gauge Select pages, accessible via the “Gauge Setup” button.

***Only data from sensors that are actually connected to the ecu and are configured correctly can actually be displayed.***

### Large Gauges

