

Toucan Touchscreen Gauge and CAL Selection Unit

User Guide (Generic) V1.1

For Toucan Firmware Version 1.98 and above, all ECUs

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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Introduction

Thank you for purchasing a Toucan display. We hope it will be easy to install and configure, and we suggest that you read this guide before installation.

Installation

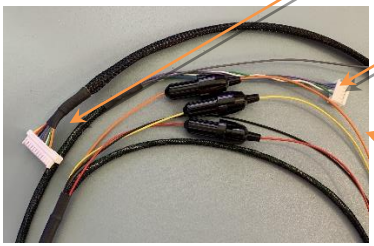
Before You Start

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

toucan Unit	*Cable Harness*	*Mount*
		

Installation

Connectors



Multiway	Connects to Toucan unit
5 pin	ECU data connector

BLACK	Power Ground
YELLOW	Permanent +12V
PINK	Switched +12V
ORANGE	Lighting circuit
GREY	CAL Switch

IT IS RECOMMENDED THAT THE CAR BATTERY IS DISCONNECTED BEFORE ATTEMPTING TO INSTALL YOUR TOUCAN DISPLAY UNIT

IF IN DOUBT, PLEASE CONSULT A QUALIFIED AUTOMOTIVE ELECTRICIAN

Power

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 feeds 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 PINK 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.

CAL Switch – Grey Wire

The long GREY wire may be connected to an ECU input for analogue (0-5V) CAL/MAP switching if required – if not, please make sure the bare end is insulated.

- **Syvecs**. The grey wire may be used, connected to a 0-5V input configured as a CAL switch but in most cases, switching will be via CANbus (see later)
- **Link, AlcaTek, SimTek, ECUMaster, Emtron**. Not generally used.
- **Haltech** – may be used if supported and required
- **MoTeC M1** – some variants do not support CAN receive, so this wire can be used if required.

Data Connector

The Toucan cable is pre-fitted with a 5-way white connector suitable for Link G4+/G4X plugin ecus. If other ECUs are used this connector can be cut off and connections made directly to the ECU.

Cable Colour	Function
Violet	RS232 RX
Blue	RS232 TX
White	CAN HI
Green	CAN LO

If used with a Syvecs Subaru Impreza PnP model then the PnP module is fitted with an RJ11 MODEM-style connector. An combined adapter and 1m extension cable for this is available from us.

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 is fitted with a mounting plate using the AMPS mounting hole pattern (common to many phone and satnav mounting systems). The plate suits the Arkon dual-T mounting system, and a vent mount is included. Alternatives are available online - search for "Arkon Mount" and then look for "dual-T" compatible mounts.

Initial Toucan 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.

CAL switch configuration

If Toucan is being used to select calibrations via the grey wire rather than CANbus (see later), it is necessary to check that the voltage thresholds configured in the ECU match those of your Toucan. Toucan supports 8 or 12 CAL positions. Analogue rotary CAL switches vary, and your mapper may have adjusted the ECU values to match your specific switch. These are typical threshold values:

8 CAL POSITIONS		
CAL	ECU threshold	Toucan Voltage
1	<0.36V	0.00V
2	>0.36V, <1.07V	0.70V
3	>1.07V, < 1.68V	1.40V
4	>1.68V, < 2.19V	1.95V
5	>2.19V, <2.79V	2.50V
6	>2.79V, <3.20V	3.00V
7	>3.20V, <3.61V	3.40V
8	>3.61V	4.00V

12 CAL POSITIONS		
CAL	ECU threshold	Toucan Voltage
1	<0.42V	0.00V
2	>0.42V, < 0.83V	0.60V
3	>0.83V, < 1.25V	1.00V
4	>1.25V, < 1.67V	1.40V
5	>1.67V, < 2.08V	1.85V
6	>2.08V, < 2.50V	2.30V
7	>2.50V, < 2.92V	2.70V
8	>2.92V, < 3.33V	3.20V
9	>3.33V, < 3.75V	3.50V
10	>3.75V, < 4.17V	3.90V
11	>4.17V, < 4.58V	4.30V
12	>4.58V	4.80V

To ensure Toucan and the ECU calibration match, you can either alter the voltages in the Toucan unit or alter the ECU to match Toucan.



Note that switching Toucan between 8 and 12 CAL positions will cause the voltages to default to the values in the tables above.

See the basic operation guide for how to adjust the CAL voltage output of Toucan.

Doesn't work?

- Double check the power wiring
- Remove the cable from Toucan and re-attach a few seconds later – this will give the unit a reset.

Datastream Configuration

Most ECUs will use CANbus to transmit and receive data to/from Toucan. Toucan will auto-detect the datastream from the ECU, but the ECU must first be configured to transmit the correct data.

Link (and Vi-PEC)

Toucan can receive runtime parameters and status information from Link and Vi-PEC ECUs via CANbus. G4 and V-series ECUs with a serial number lower than 10,000 will need a CAN upgrade by a Link dealer.

Toucan is also capable of activating CAN Digital Input (DI) channels 1 to 8 on Link G4+ and Vi-PEC i-series ECUs. For the G4X, CAN DIs can still be used, but V1.98 onward Toucan firmware now supports the transmission of "GP Rotary Switches" via CANbus for custom table adjustments (e.g. "CAL" switching).

Gauge Data Setup – G4X

A specific stream files can be downloaded from the JT Innovations website:

Toucan CAN Stream G4X.lcs

Configuration of the ECU is done via the "CAN Setup" feature, accessible from the "ECU Controls" drop down menu.

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 User Stream "**X**"' from the Mode drop-down menu (where '**X'** is the first available transmit user stream number)
7. Set the Transmit Rate to 20 Hz.
8. Set the CAN ID to 1500, and ensure the Format is set to "Standard"
9. 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.
10. Select the downloaded '***Toucan CAN Stream G4X.lcs*** and click the Open button.

Gauge Data Setup – earlier variants

Configuration of the ECU is done using 2 files available from the JT Innovations website:

Toucan CAN Extra Frame V189 onward G4+.lcs.

There are versions of these files on the website for earlier Toucan firmware releases if needed.

Configuration of the ECU is done via the "CAN Setup" feature, accessible from the "ECU Controls" drop down menu.

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"
9. Select the next spare CAN Channel.
10. Select 'Transmit User Stream **X**' from the Mode drop-down menu (where '**X'** is the first available transmit or user stream number).
11. Set the CAN ID also to 1500, transmit rate to 20Hz, and ensure the format is set to "Standard".

CAN Control messages

Download the appropriate stream file from the JT Innovations website:

1. Toucan CAN DI V198 onward G4X.lcs for G4X ECUS, or
2. Toucan CAN DI V189 onward G4+.lcs ofG4/G4+ ecus.

Again, using the "CAN Setup"menus of PCLink:

1. Select 'Receive User Stream **Y'** from the Mode drop-down menu (Where 'Y' is the next unused receive user stream number).
2. Set the CAN ID to 1501.
3. Ensure the Format is set to "Standard"
4. Change to the Streams tab of the CAN Setup window. Select Stream **Y** – where "Y**"** is the stream selected above - and then click Load Stream.
5. Select the CAN DI file previously downloaded, making sure it is the variant intended for your ECU and Toucan firmware version and click the Open button.
6. Make sure no other CAN channels are configured on the same CAN IDs.
7. Click Apply and then OK.

Make sure a Store (F4) is performed.

You must also select the appropriate G4 type (G4, G4+ or G4X) via Toucan's More Page 4 menu.

CAN 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 "CAN 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.

G4+ CAN DI setup.

For the G4+ Toucan 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, CAN Digital Inputs must be configured using the PCLink software to correctly assign functions to the relevant CAN DI channel(s). You may need your mapper to do this for you.

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).

G4X GP Rotary Switch Setup

The G4X still has the same CAN DI facility as described above, so this can be used if preferred. Toucan firmware V1.98 onward also allows for a pair of “GP Rotary Switches” which can be used in one of 2 ways:

Control Via Toucan

In “G4X” mode, a pair of 12 “CAL” position selection switches are provided (initially labelled as “CAL” ands “ALS” menus on the touchscreen, but they can be used as required) and the data is transmitted via CAN (once setup, as described above). The 12 steps can be used to control G4X tables – you may need your mapper to set this up for you.

Control Via Physical Switches

In “G4X” mode, if you are using physical rotary switches, the switch position selected will be transmitted to Toucan so you can see on the screen what position is in use, and edit the text to be something meaningful and useful.

ECU Configuration – Anti-Theft

Toucan allows “CAL 9” (G4+) or “CAL 12” (G4X) to be used to enable an immobiliser/anti-theft function. In combination with requiring a PIN to change to or from the last CAL this can be a useful additional level of security.

To enable this function, you must have configured the CAN DI streams as described above, and the ECU set such that the “Allow CAN Anti-Theft Request” is enabled.

For the G4X, if 12 actual rotary switch position are wanted, and no immobiliser function, simply do not set the “Allow CAN Anti-Theft Request”.

Syvecs/Life Racing

For most installations, CANbus will be used to communicate with Toucan, but the exact methodology depends on the ECU variant and vehicle.

RX Mode

"More" Page 4 allows a choice between CAN 1Mbit/s (the default), CAN at 500kbit/s (0.5Mbit/s) or S232.

S232

This is a special mode where the Syvecs ECU replicates the CAN content on an RS232 datastream. This is used if there is a reason Toucan cannot be connected to the ECU CANbus. The exact format of the data is dependent on the CAN RX mode as below.

Toucan Receive (RX) Modes

This is configured on "More Page 4" with the following options:

- **S6**. Only 20 CAN frames are checked
    - The S232 protocol is automatically configured in Toucan to match that used by the S6 and S6+ ECUs.
- **FIXED**. This sets the Toucan to expect the fixed datastream that is available on CAN1 of S7 ECUs.
    - The S232 protocol to expect the same data as per the Fixed CAN datastream, so if using S232, the RS232 Datastream of the ECU should be set to "Syvecs" via SCal; this is only applicable to the S7.
- **CUST**. This sets the CAN to expect the (up to) 40 frames of CAN data as allowed in the "Generic Transmit" frame/slot assignments of S6/8/12 or S7 CAN2. There is a default set available for Toucan (download from the website), but you can manually edit these to match the ECU if necessary. See later.
    - The S232 protocol is also set in this mode to follow the Generic Transmit CAN setup so the RS232 datastream in the ECU should be set "CAN ECHO" via SCal.

Toucan Transmit (TX) Modes

This only applies to CAN data (no data is transmitted via RS232)

- **OFF**. No CAN data is transmitted
- **GEN** – uses the S7/S8/S12 "Generic Receive" format, as described later, to send control data via CAN for:
    - TC or launch CAL selection
    - Launch Control on/off
    - ALS on/off
    - The S6/S6+ do not support this mode.
- **SYV/M4** – uses the Syvecs extensions to the Bosch M4 protocol. This is mostly used for the S6/S6+ and early S7I ECUs with only 1x CANbus to send control data via CAN for:
    - CAL selection
    - ALS on/off if required ("Receive ALS Enable Switch" must be enabled in SCal).

  This mode is found in SCAL under "Syvecs CAN Receive"



Note that Toucan does not transmit all of the data the comprises the Bosch M4 ABS data set so, unless the vehicle is already transmitting these and the vehicle CAN bus is connected to the Syvecs, there will be errors reported due to the missing frames.This is normal and is not a cause for concern.

SCal Configuration for "Generic Receive", S7 using CAN2, or S8/12

Using CAN2 on the S7+, or either CAN on the S8

- Under "Datastreams", then "Generic CAN receive":
  - Set "Receive B Enable" to "YES" for "B01..B08".
  - Set "Receive B Bus" to "CAN2" (for S7+) or (usually) "CAN1" for the S8
  - Check that "Receive B Identifier" for "B01..B08" is set to "0x64Eh" (this is **NOT** the default)
- Under "IO Configuration" and "Pin Assignments" set, as required:
  - ALS Enable Switch to use "X:CAN RECEIVE B #01"
  - Launch Control Switch to use "X:CAN RECEIVE B #02"
  - Calibration Switch to use "X:CAN RECEIVE B #03"
  - ALS Select switch (or Traction Control Switch, as preferred) to "X:CAN RECEIVE B #04"
  - Calibration Override switch to "X:CAN RECEIVE B #05"
  - Launch Select switch to "X:CAN RECEIVE B #06"
- Check and if necessary edit the "Generic CAN Transmit" stream:
  - Frame 11 Slot 1 either "tcSelect" or "alsSelect" as required
  - Frame 11 Slot 2 is "calSelect"
  - Frame 11 Slot 3 is "launchRPM"

5V Output Modes

The grey wire in the Toucan cable harness has traditionally been used as a stepped 0-5V control to mimic a rotary CAL switch. Although of limited use for the current range of Syvecs ECUs, if any of the TX modes are being used to control CAL selection instead, this output can be changed to be:

- 0-5V on/off switch following the Launch Control button on the main gauge screen
- 0-5V stepped control following the Traction Control (TC) CAL select menus

These modes are mostly used for S6/S6+ or single-CAN S7I ECUs.

Additional Features

Sensor Alarms

Syvecs firmware version 1.25 onwards allows sensor alarms to be configured, and for this information to be transmitted via CAN bus to Toucan. In essence, individual sensors can be configured to be ignored if they fail, or to generate a minor, moderate or critical alarm value. If this is configured in the calibration, Toucan alarms can be enabled to draw your attention to sensor failures. SCal will still be needed to determine which sensor has actually caused the alarm.

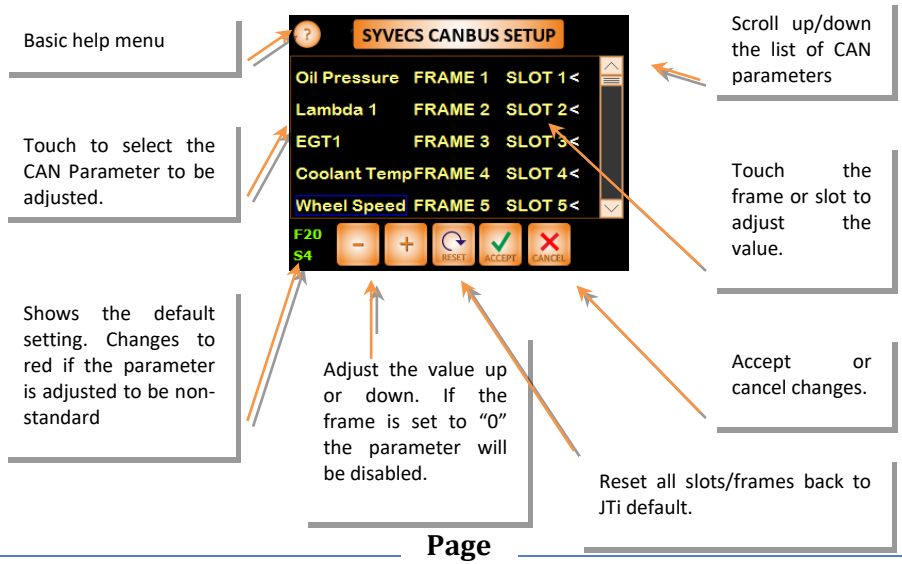
Your mapper can advise on the best configuration of sensor alarms for your specific vehicle, or contact JT Innovations technical support for advice.

Changing Frame/Slot Assignments (except S7 CAN1 which is Fixed)

Although the JT Innovations-supplied CAN datastream definitions are applicable in most cases, there are occasions when it is not possible to use this. One example is when the Syvecs is installed in a vehicle that uses a CAN bridge module, which then needs CAN data in specific, incompatible slots.

On "More Page 4" you can access an editor to alter the Toucan CAN frame and slot assignments.

This is considered an Advanced option and should only be done if you are comfortable accessing the calibration in your Syvecs using SCal to determine the frame and slot assignments.



Turning Parameters Off

The frame/slot assignments can be used to turn off parameters by setting the frame to “0”. This is mostly useful in two specific instances:

1. Traction CAL. If the frame is set off, the “TC” icon will not appear on the main screen and the ability to name and select the traction CALs is hidden.
2. Turning off knock ignition retard assignments for any cylinders will make sure the knock value for those cylinders are not displayed, nor used for the overall knock alarm calculations.

Extended Gauge Set.

There is a duplicate set of gauges for: Gear, Air Temp, Coolant Temperature, Throttle, RPM, Oil Pressure and Oil Temperature. By default these parameters have their frame assignment set to 0, which hides and disables them. They can be “activated” by configuring valid frame and slot settings – these must match the setting of the ECU datastream – and they can then be chosen to be viewed on the main gauge screens etc.

These can be useful if, for example, two air temperature sensors are fitted, one before and one after the intercooler perhaps. They can also be used for any other parameter (e.g. transmission temperature) as long as the parameter scaling matches that of the gauge itself.

Status Indicators

Status indicators are available on any or all of the main gauge pages in the location of the two smallest gauges. By default, the CANbus frame assignments are set to frame 12 Slot 1 – if the ECU is set to transmit a status (such as aircon, or water injection, etc.) then status can be viewed. Status “0” will show as a red indicator, “1” as green, “2” as yellow and “3” as blue.

Launch RPM

The S7/S8/S12/F88 ecus support launch RPM adjustment in most cases. The RPM is adjusted via a “Launch Select Switch”, with rpm offsets applied to the base/calibration launch rpm, as set by SCal.

Using Toucan’s CAN TX mode, Launch Calibration Switch selection (1 to 12) can be set via the full screen RPM gauge when the CAN TX mode is set to “GEN” (meaning “Generic”, or Syvecs “Generic Receive” mode) using up/down buttons on the screen. The CAN RX mode will need to be “CUST.”, and the Generic Transmit stream calibration edited to include “launchRPM” – the default Toucan frame/slot setting for this is Frame 20, Slot 1.

Emtron

Toucan can receive runtime parameters and status information from Emtron ECUs and is also capable of sending messages to the ECU to control:

- CAL switching
- Launch on/off
- ALS on/off
- Either ALS or Traction Control CAL switching (as preferred)

Configuring the Gauge Datastream

Files will need to be downloaded from the JTinnovations website – there are 2 files in a file called "Toucan Emtron Frames.zip" from the relevant page of the 'site.

Use the Emtune PC program to configure the CAN datastreams.

1. Set CANbus 1 to 1Mbps
2. Set CAN1 – Channel 1 to
    - Enable ON
    - Pre-defined Tx Data Set 1
    - CAN Base Address = **1250**
    - Addressing – **Sequential (11 bit)**
    - Direction – Transmit
    - Transmit Rate 10Hz, max 20Hz.
3. Configure Custom Tx Data Set 1 – read in "Toucan Emtron Additional TX Frames.edf" and set Can1 – Channel 2 as follows
    - Enable ON
    - Transmit "Custom Tx Data Set 1".
    - CAN Base address **1260**
    - Addressing – **Sequential (11 bit)**
    - Direction – Transmit
    - Transmit Rate 10Hz (or 20Hz) – makes no big deal, but no point being faster
4. Configure Custom Rx Data Set 1 – read in "Toucan Emtron RX Frames.ecx"
5. Set CAN 1 – Channel 3 as follows
    - Enable ON
    - Transmit "Custom Rx Data Set 1".
    - CAN Base address **1270**
    - Addressing – **Single (11 bit)**
    - Direction – Receive

Toucan will auto detect the stream as usual. TX functions from Toucan are:

- CAL switching – sent as CAN AN Volt 1, with each step as 650mV, 8 steps
- Launch on/off – sent as CAN AN Volt 2, switching between 0/5V
- ALS on/off – sent as CAN AN Volt 3, switching between 0/5V
- ALS or TC CAL or whatever (use as wanted) - sent as CAN AN Volt 4, with each step as 650mV, 8 steps

Haltech and ECUMaster

Before Toucan can display any gauges, the ECU must be configured correctly.

ECU	Configuration
Haltech	No additional setup required – the Haltech "V2" protocol is usually pre-selected as the default.
ECUMaster	Configure the ECU to transmit the "Haltech E8 E11v2" protocol at 1Mbit/s

Trim Switch

If the ECU variant used supports the use of trim selection switches, Toucan provides an 8-way voltage output to emulate a physical switch. This is named a "CAL" (calibration) output in Toucan.

This voltage is available on the grey wire of the supplied cable harness, and it should be wired to the appropriate input pin of the ECU.

By default, the 8 steps are set to the following voltages, although these can be adjusted if needed:

TRIM VOLTAGE OUTPUT	
CAL	**Toucan Voltage**
1	0.00V
2	0.70V
3	1.40V
4	1.95V
5	2.50V
6	3.00V
7	3.40V
8	4.00V

MoTeC M1

Note that for Toucan to auto-detect the MoTeC M1 datastream, the Syvecs CAN RX mode on More Page 4 **must** be set to "S6".

Toucan uses the MoTeC "M1 General" datastream and defaults to a 1Mbit/s datarate although that can be changed to 500kbit/s via the Toucan menus if required.

This stream should be enabled on the CANbus channel that Toucan has been wired to – the setting is in M1 Tune via the "ECU Transmit" options under the Communications tab of Vehicle settings.

MoTeC Control Functions

Toucan allows the following functions to be controlled from the touchscreen interface:

- launch control on/off
- antilag on/off
- launch RPM adjustment (10 steps)
- A 10 position "driver rotary switch", usually used for calibration ("map") switching
- A second 10 position driver rotary switch which can be used, for example, as a traction control selection switch
- Keypad functions (e.g., cruise control on/off). These are described in a separate document available on the JT Innovations website.

Data is transmitted as follows:

CAN ID	Byte/Word	Function	Message/Offset
0x211 (529)	Word 0	CAL switch (value 0-10)	Message 1 Offset 0
	Word 1	TC Switch (value 0-10)	Message 1 Offset 2
	Word 2	Launch rpm (value 0-10000)	Message 1 Offset 4
	Word 3	0	
0x212 (530)	Word 0	Launchswitch	Message 2 Offset 0
	Word 1	ALS switch	Message 2 Offset 2
	Word 2	0	
	Word 4	0	

To make use of these functions, User Inputs must be configured using the MoTeC M1 tune software. This is done via the "ECU" and "Receive" options under the Communications tab of Vehicle settings:

- Select the Physical CANbus channel used (e.g., CAN Bus 1)
- Set the CAN ID to 528 (NB – Toucan transmits with ID 529, but the setting in M1 Tune has to be a multiple of 16 as the "base" address for 16 received channels, which in this case is 528).

The M1 ECU allows up to 4 “Driver CAN switches”, so only 4 of the functions above can be controlled unless the M1 is running custom software. The required function can be allocated to a Driver CAN Switch using the message and offset from the table above.

For example:

- to use Toucan’s launch switch, CAN Switch 1 could be allocated to Driver CAN Switch 1 by setting it to Message 2 Offset 0
- In the “Race Functions” section of M1 Tune, configure the “Driver Anti Lag Switch Index” to be “Driver CAN Switch 1”

AlcaTek

Note that for Toucan to auto-detect the AlcaTek datastream, the Syvecs CAN RX mode on More Page 4 **must** be set to “S6”.

The AlcaTek ECU may need configuring to allow launch control and ALS on/off to be performed by Toucan – please discuss with your mapper as there is no publicly accessible version of the AlcaTek tuning software to refer to.

Simtek

Please discuss with your mapper. There is no configuration of Toucan necessary.

CANbus Termination

It will be necessary to enable the bus termination if Toucan is the last device on a 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.

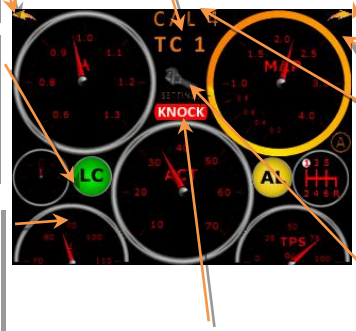
Menus and Operation

Gauge Screens

Touch here to change current calibration. Label shown is the first 5 characters of the text entered.

Touch here to go to next gauge page

Touch here to go to previous gauge page



Shows which gauge screen is showing: A, B, C or D.

Launch Control status

- Red - OFF
- Yellow – armed, not active
- Green – active

Shows current Traction Control CAL. Touch to edit the names for each TC CAL and, if enabled, change the TC CAL. Labell shown here is the first FIVE characters off the entered text

Touch the centre of any gauge to display the full screen version and then cycle through all gauges or reset the peak marker.

Press and hold any gauge to display the most recently shown large gauge.

Return to the main gauge screen by touching the centre of the large gauge.

Touch here to enter SETTINGS menus

Shows Knock ignition retard has exceeded set value on any 1 or more cylinders (CANbus only). Also shows sensor alarms and limp/cut mode.

Touch to show knock, limp mode or sensor alarm full screen “gauge”.

AntiLag status

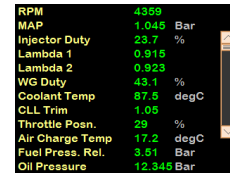
- Not present – not active
- Yellow – start CAL
- Green – active
- Red - shutdown

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 readings from sensors that are actually connected to the ECU and configured correctly will be displayed.

Large Gauges

Goes to parameter list view.



Touch here to return to main gauge screen.



Touch here to mute an active alarm. Will be automatically unmuted when the alarm next clears

Resets the peak marker.

Settings Menu

Touch here to select full brightness



Touch here to mute or unmute audible alarms.

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

Touch here to change current calibration

Touch here to return to gauge screen

Touch here to enter SETUP menus

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.

Setup Menu

Touch here to adjust night brightness level



Touch here to configure alarms.

Touch here to adjust CAL voltages

Touch here for "More" menus

Touch here to choose gauge layout and colour scheme

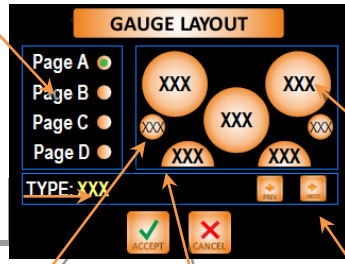
Touch here to return to settings menu

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



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

Gauge name is shown here

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

A unique “CAL Override” button may be placed here only, on one or more pages.

See “Advanced CAN configuration” .



The two smallest gauge positions can be used for generic status indicators on one or more pages. Syvecs only - See “Advanced CAN configuration.

CAL Selection Menu

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



User Text describing this calibration

Touch here to edit the User Text

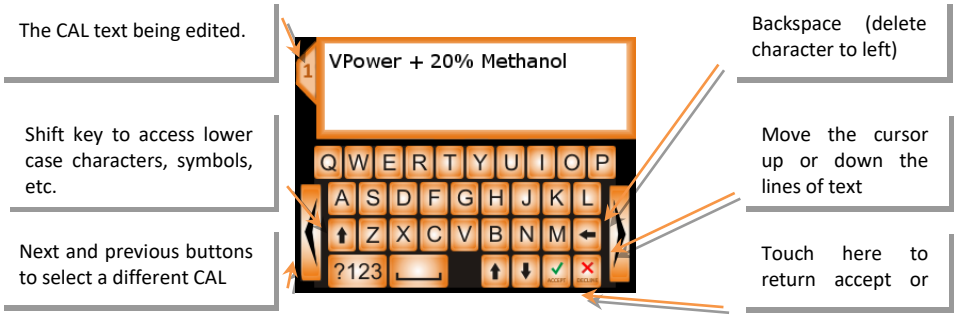
Next and previous buttons to select a different CAL

Touch here to return to previous menu

Traction Control Selection Menu

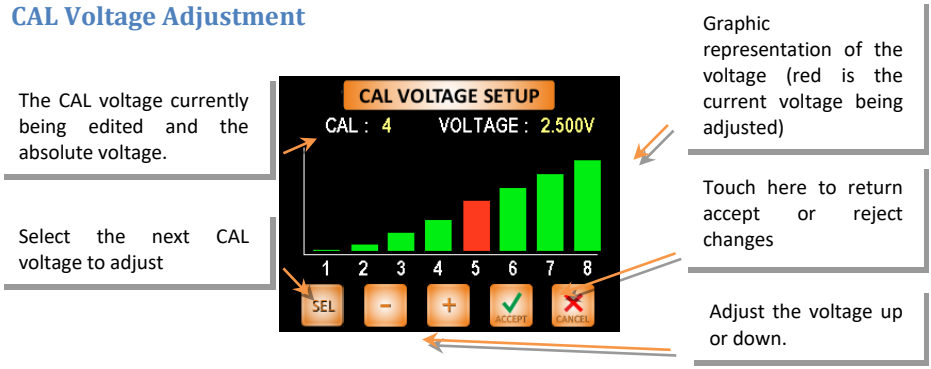
This is identical in operation to the CAL adjust function.

Editing CAL Text



Note that the first five characters of the CAL text is used on the main gauge screen as the label displayed and, likewise, if TC selection is available, the first 5 characters of the TC text will be displayed on the main gauge screen.

CAL Voltage Adjustment



Toucan supports 8 or 12 CAL positions which can be set via the “More” menus.

Note that switching Toucan between 8 and 12 CAL positions will cause the voltages to reset to default values.

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" CAL (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 or 12), *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 the highest numbered CAL position available in the ECU – usually 8 or 12 - (although this can be CAL 1 if a Syvecs input with no pullup resistor is used). It is generally recommended that the valet or anti-theft CAL is in position 8 or 12, 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.



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.
- Each large gauge has a "mute" button that temporarily mutes the alarm until either it clears and re-occurs; or you unmute it; or Toucan is repowered.

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.

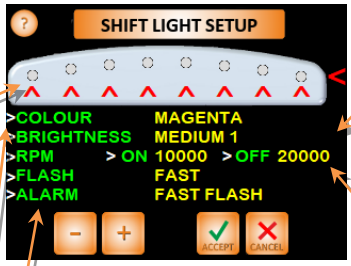
Available Alarms

- 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. Any value in range 0-20 degrees of ignition retard in 0.5° steps. Default 5° (looks at all engine cylinders).
- 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.
- Limp/Trip. Enables an alarm if Syvecs enters Engine Limp or Trip mode.
- MAP. Any value from 1.0 to max, 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. If configured in the Syvecs ECU, sensor alarms will notified, displayed as minor, moderate or critical as per the Syvecs calibration
- 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

Shiftlight Configuration

If a JT Innovations Shiftlight is connected to Toucan, the shift LEDs can be configured from the Toucan screen. This is accessed via the Shift Light Setup button on the Setup screen.





Choose the LED to configure

Required colour and brightness, and whether the LED should flash, for the selected LED

Flash mode for outer 2 LEDs if there is a Toucan Alarm triggered.

Select to allow modes to be configured for "all LEDs"

The selected LED will light up at the configured "ON" rpm then extinguish at the configured "OFF" rpm

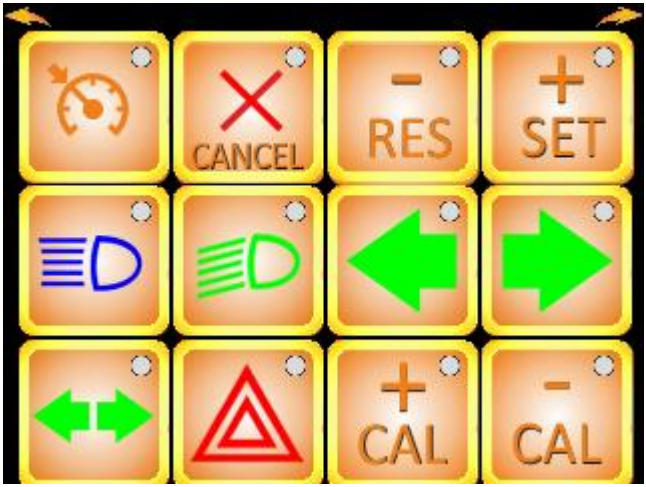
"More" Menus

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
- Enable the keypad option
- 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 first or the last CAL, or both first and last CALs.
- 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 and trough for just a few seconds and then drop back to the current reading. The hold period can be adjusted.
- Choose between 8 or 12 CAL positions
- Configure the data receive and transmit options
- 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, the current/actual CAL voltage, and the currently detected communications protocol.

Keypad

A Keypad can be enabled via the “More” menus. A separate document is available from the JT Innovations website that explains how to configure the keypad.



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.

Note that the “Arkon” AMPS mounting plate on some Toucan units made in 2021 obscures the USB socket. The plate will need to be unscrewed to allow the USB cable to be attached.

Technical

Data Interface	CAN 2.0B at 1Mbit/s or 500kbit/s with selectable termination, or RS232 .
Expansion Connector	RS232, CAN, Power Out and Ground. Allows connection of a shiftlight add-on.
Power	8-20V <200mA typ. <40mA in standby mode Connections to permanent, switched and illumination power, via 1A fused connections.
CAL Voltage	Adjustable via menus to match ECU configuration. Fail-safe monitoring of CAL voltage.
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 (ECU-dependent)	Air charge 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; Oil Pressure; Oil Temperature; RPM; Sensor Error; Throttle Position; Coolant Temperature; Road Speed; Barometric Pressure; Ignition Advance; WasteGate Duty; Crankcase Pressure; Engine Coolant Pressure; Gear Oil Temperature; Generic 10 Bar Sensor. NOS Pressure. Others may be added occasional periodic firmware updates.

CAN ID Ranges and Toucan Auto-detect

Toucan is designed to auto-detect the connected ECU by the CAN stream received, and it does this via the CAN IDs of the received stream. The IDs' used by each manufacturer are, in the most part, unique (and where not, Toucan has configuration options to take account of the overlaps) but occasionally a conflict might occur, especially if there are other devices on the CANbus.

To help troubleshooting this, here are the CAN ID ranges Toucan expects:

ECU	CAN ID Range(s)
MBE	0x320
Haltech	0x360-0x363, 0x368-0x375, 0x3E0-0x3E4
Link/Vi-PEC	0x5DC (Link G4 0x3E8)
Syvecs S6	0x600-0x613
Syvecs S7/S8/S12/Life defaults	0x600-0x622
AlcaTek[1]	0x620
MoTeC M1[1]	0x640-0x65F and 0x683
ECUmaster	0x690-0x696
Simtek	0x700-0x703
Keypad "LED" RX	0x740 or 0x625-0x627 depending on mode

Toucan will also transmit data on the CANbus as follows.

Reason	CAN ID Range(s)
Shiftlight data	0x1D and 0x1E
MoTeC M1[2]	0x211 and 0x212
Emtron[1]	0x4F6
Link[1]	0x5DD
AlcaTek[1]	0x621
Syvecs CAN TX mode = "GEN" [2]	0x64E
Toucan Keypad button presses[3]	0x741 or 0x231-0x215 depending on mode
Syvecs CAN TX mode = "SYV/M4" [2]	0x777 and 0x778

1. These ECUs will only be auto-detected if the Syvecs CAN RX Mode on "More" Page 4 is set to "S6".
2. Data only transmitted on this ID if the associated ECU has been autodetected
3. Data only transmitted if the Keypad functionality has been enabled.

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