Toucan Touchscreen Gauge and Trim/Compensation Selection Unit
User Guide (MoTeC M1) V1.0

Firmware Versions 1.84 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

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.

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

Wire ends with terminals	Data connection to MoTeC 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

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.

CANbus wires

The end of the cable provides the CANbus connection to the ECU and the wires are pre-terminated with the correct pin for the MoTeC ECU plugs. The wire colours are:

White	CAN LO
Black	CAN HI

These pins can be inserted into the appropriate location on the M1 ECU plugs – please refer to the documentation for your specific M1 variant for the correct pin numbers.

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.

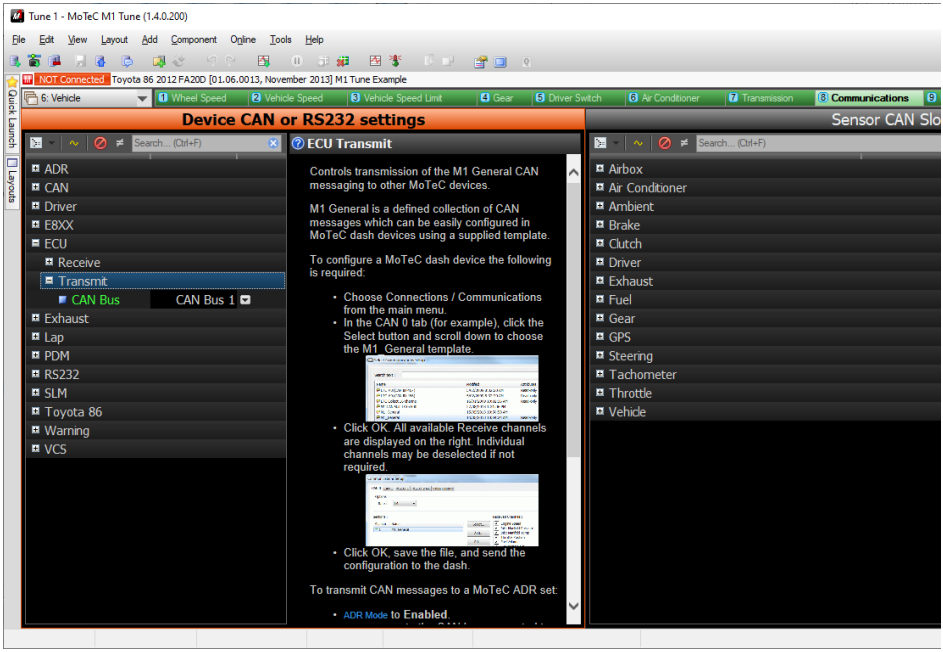
The mount supplied is the choice made when you purchased your unit, but they may be purchased separately, if required, from our website (www.JTi.uk.com).

MoTeC 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 MoTeC ECU must be configured correctly.

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 - a CANbus database (Vector/Kvaser "dbc") file is available on request.

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"

Menus and Operation

Gauge Screens

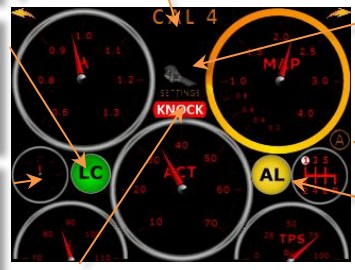
Touch here to go to previous gauge page

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 enter SETTINGS menus

Touch to turn launch control on or off
- Red - off
- Green – on



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

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.

Knock warning. Also shows sensor alarms using a different icon. Touch the icon to bring up a display of current sensor errors.

Touch to cycle through both available antilag maps.
- Red – off
- Yellow – ALS1
- Green – ALS2

Four gauge screens, plus a keypad screen, are available with complete flexibility of which gauge is displayed and 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

Touch here to return to main gauge screen.

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

Goes to parameter list view.

Resets the peak marker.

Settings Menu

Touch here to select full brightness

Touch here to 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 mute or unmute audible alarms.

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 lighting stalk.

Setup Menu

Touch here to adjust night brightness level

Not applicable to the MoTeC ecu.

Touch here to choose gauge layout and colour scheme

Touch here to configure alarms.

Touch here for more menus

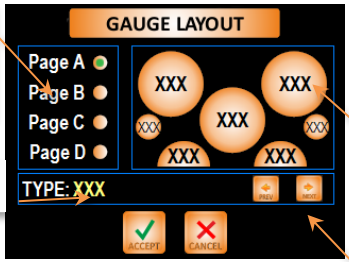
Touch here to return to settings menu

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

Trim/Compensation CAL Selection Menu

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

User Text describing this calibration function

Next and previous buttons to select a different setting

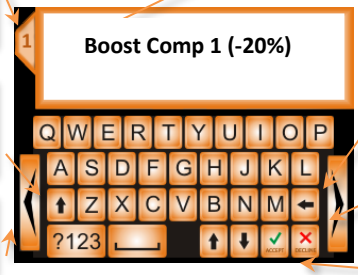
Touch here to edit the User Text

Touch here to return to previous menu

Editing Trim/Compensation CAL Text

First 5 characters used as label on main screen

The text being edited.



Backspace (delete character to left)

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

Move the cursor up or down the 3 lines of text

Next and previous buttons to select a different CAL

Touch here to return accept or

Trim/Compensation CAL PIN Protection.

If enabled via the “more” menus, Toucan can be set to prevent the current Trim/Compensation 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 10), *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 pullup 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.

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.

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 from 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

"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)
- 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
- Enable a 12 button Keypad as a 5th gauge page

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.

Sensor Alarms

If the sensor alarm is enabled, any failed sensor 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 how many sensors have failed, and the name of the sensor that has failed.

If more than one sensor has failed, the list can be stepped through using the next arrow on the gauge/alarm.

Launch Control

If configured on your ecu, launch control can be requested on or off via the main gauge pages by pressing the launch control button on the left. Launch RPM can be adjusted via the large RPM gauge in 100 rpm increments, with a marker to show the current setting. There is a setting in in the “more” menus that allows the RPM gauge to be automatically displayed when launch control is enabled.

Antilag Control

If configured on your ecu, antilag control can be requested on or off via the main gauge pages by pressing the ALS control button on the right.

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.

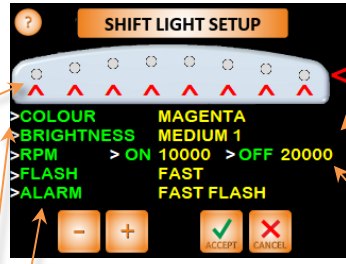
Shiftlight Configuration

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

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. <40mA in standby mode 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