Performance Vehicle Telemetry Displays

www.btigauges.com

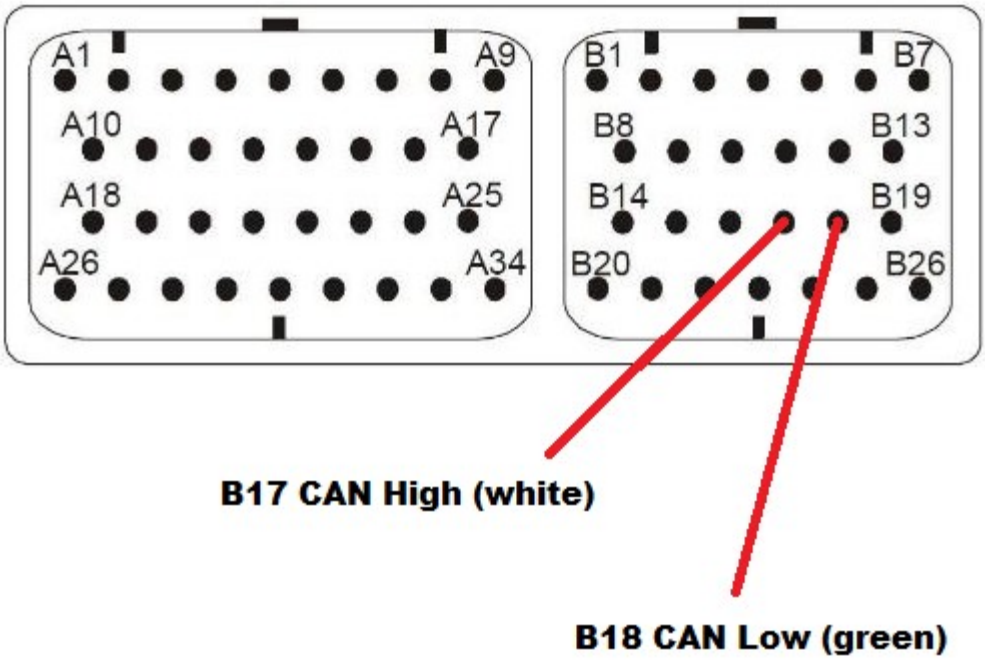
TFT CAN Bus Gauge for MoTeC M1
Plug and Play Installation Manual
Doc version 1.0

Notice: This product is intended for Off-Road use only.
Never take your eyes off of the road while using this device.
If you are uncomfortable with wire termination, please have this device installed by a competent shop.

**** Notice! This device should be configured by competent personnel. Raising the BOOST too much or reducing the Traction Control too much can have severe consequences. You could blow your engine and or lose control of your vehicle****

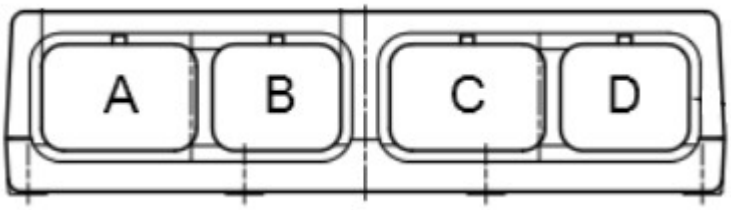
MoTeC M130 Connector Pin-out:

B17	CAN_HI	CAN Bus 1 High
B18	CAN_LO	CAN Bus 1 Low



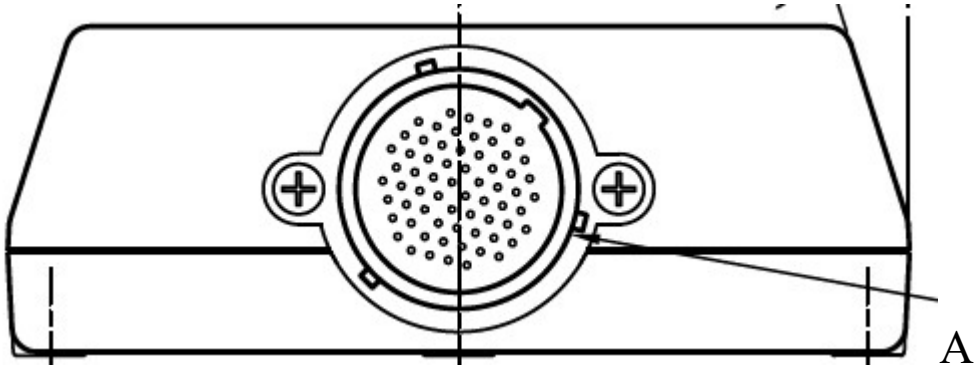
MoTeC M142 and M150 Pin-out:

D17	CAN1_HI	CAN Bus 1 High
D18	CAN1_LO	CAN Bus 1 Low



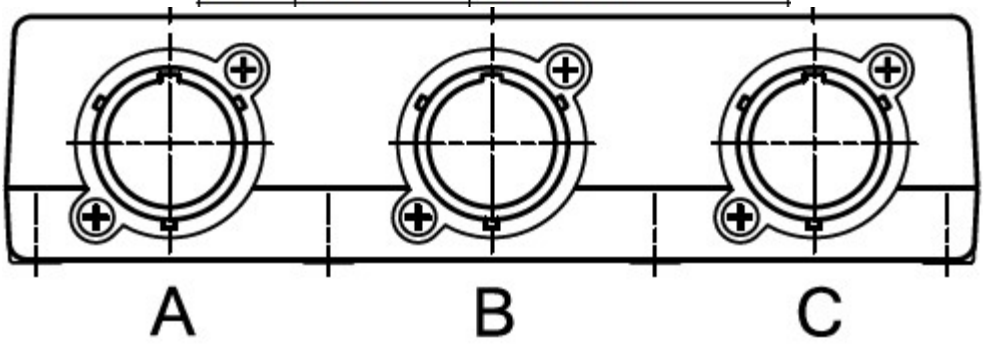
MoTeC M170 Pin-out:

A31	CAN_LO	CAN Bus 1 Low
A40	CAN_HI	CAN Bus 1 High



MoTeC M182 & M190 Pin-out:

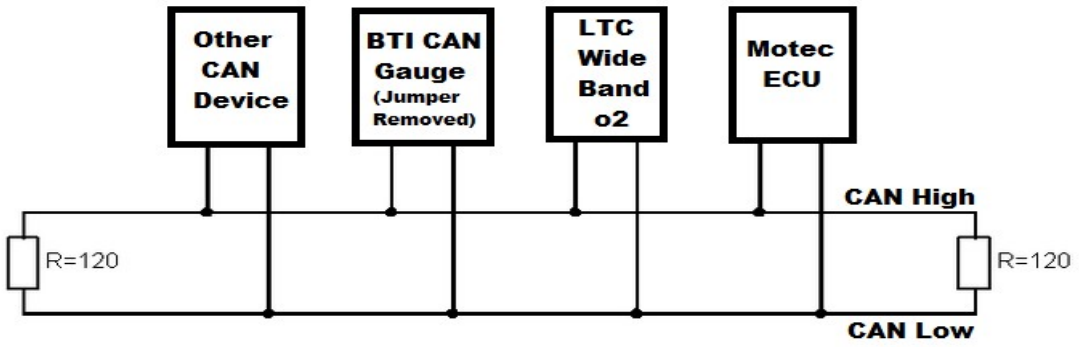
C24	CAN1_HI	CAN Bus 1 High
C31	CAN1_LO	CAN Bus 1 Low

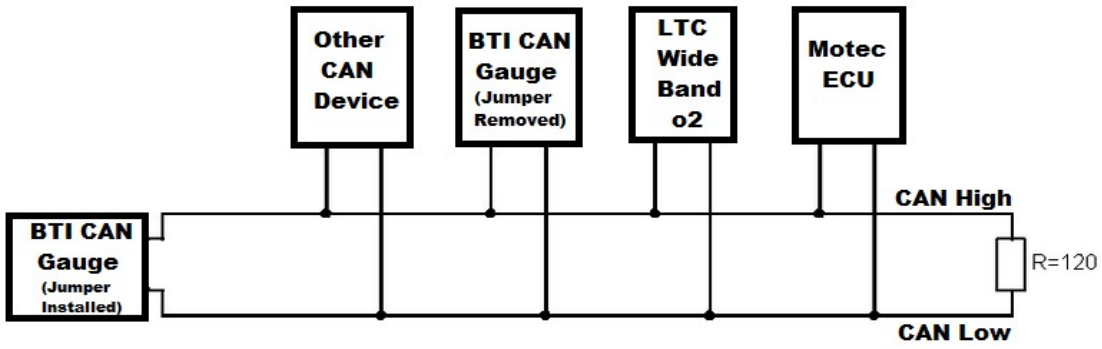


Making the connections:

The terminations to the Motec CAN bus are relatively simple as it only consists of two wires: CAN High and CAN Low. These connections can be soldered to the CAN bus or you may use the supplied 3M T-Tap connectors.

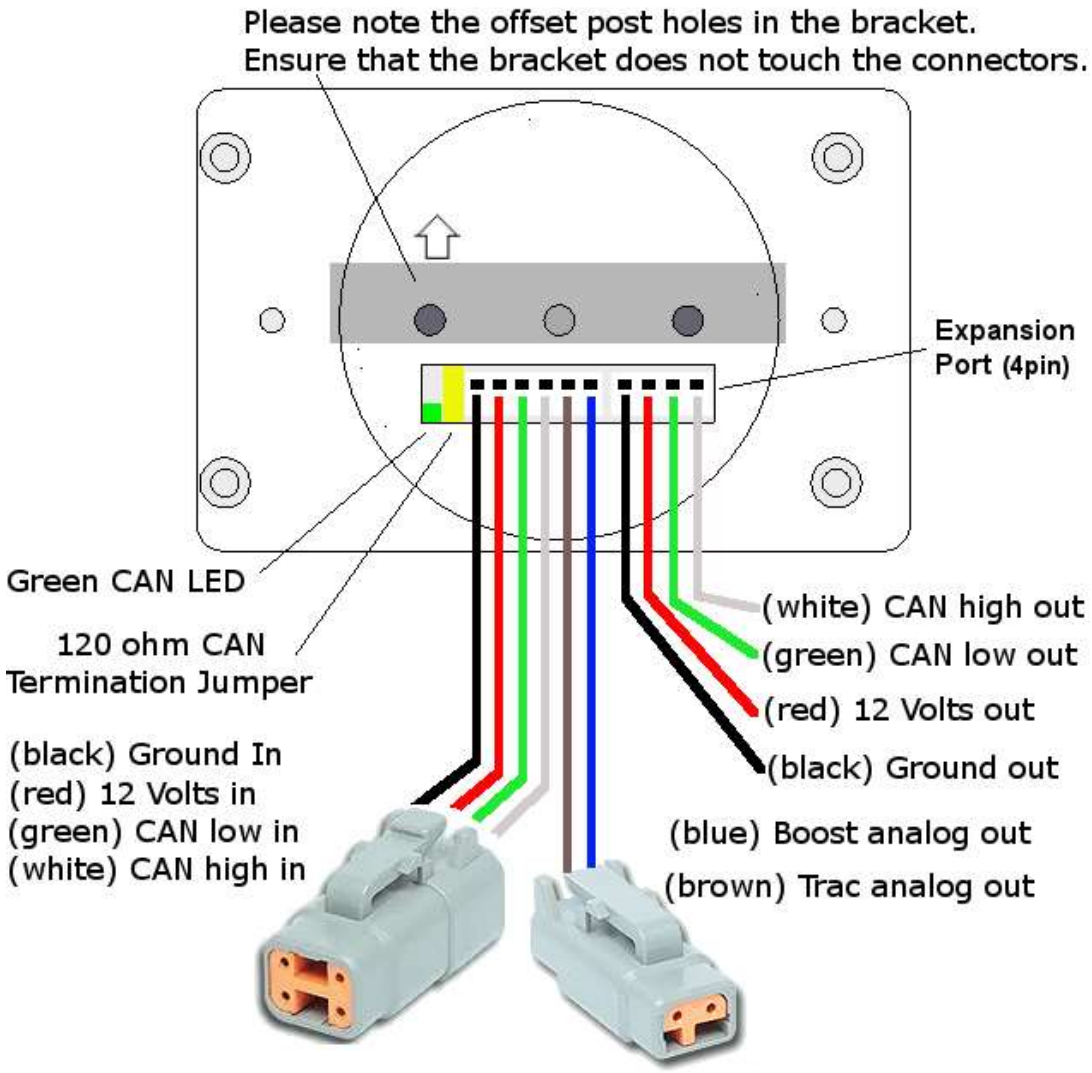
Note that the Yellow Termination Jumper located in the back of the BTI gauge should be removed if the gauge is not the last device in the CAN bus or there is already a termination resistor in your CAN bus.





2 Pin Analog Out Connector (Brown and Blue Wires)

The two pin DTM connector is used for an analog output for boost and traction control. **This option is not used when using the CAN XMIT option.** The number of voltage steps may be programmed using the BOOST PWM STEPS and TRAC PWM STEPS buttons in the settings. Idealy, more features may be controlled by using the CAN bus output instead of the analog outputs. Connect the blue and brown wires to the corresponding inputs that are selected for your application. There are more details regarding under the Gauge Setup Options section.



Notice: The gender of the 2 pin plug may be reversed on newer models in order to prevent the improper connection to the "Flash Enable" connector.

Data LED: This indicator will flash when ever the gauge is energized and CAN communications are present. Use this to confirm communications.

CAN Bus Termination Jumper: Remove this jumper if the gauge is not the last device on the CAN Bus. If there are multiple gauges, the last gauge should be the only gauge with the jumper installed.

Operation:

Upon powering up a properly terminated gauge, the Gauge will display the interface and version number.

M1 CAN bus options:

This gauge is designed to read the O2 sensor data from an LTC wideband controller.
The gauge will look for sensor #1 data on 0x460 and sensor #2 data on 0x461 which should be default values. In the event that you do not have an LTC, some of the more popular packages will output the analog O2 sensor data on the first byte of 0x651.
The gauge will look for O2 sensor #1 data there if no LTC modules are detected.

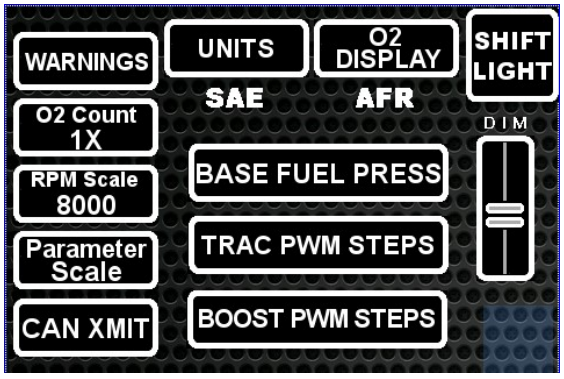
Torque and Horsepower are not standard parameters in the M1 CAN protocol. The John Reed package outputs this data on CAN address 0x647 and this display is designed to read those parameters. Horsepower is a 16 bit word starting at byte 0 where one bit = .1 Watt. Torque is a 16 bit word starting at byte 16 where one bit = 1 Nm.

Gauge Setup Options:

Touch the cog wheel on the touch screen in order to configure the gauge. 

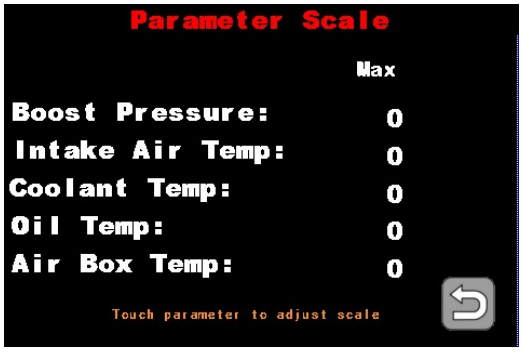
This will bring you into a screen where the Boost Control, Traction Control, and Settings can be accessed.

Press the **SETTINGS** button will allow you to make the following changes:

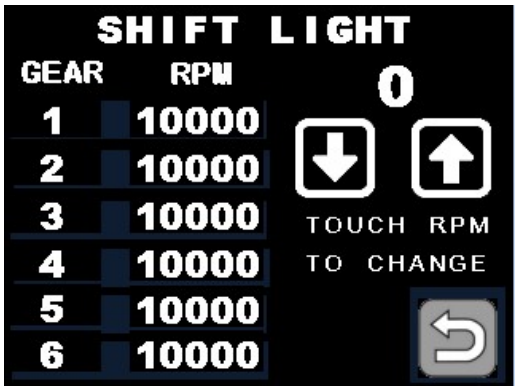


UNITS button will allow the user to toggle between SAE and SI units. This applies to temperature, pressure, speed, and distance.
O2 DISPLAY button will change how the Oxygen sensor data is displayed. The options are AFR and Lambda.
O2 Count: Select “1X” if you are running 1 wideband O2 Sensor, select “2X” if you will be running 2 wideband sensors.

RPM Scale: Select “8000 RPM” if your redline is below 8000 RPM or select “10000 RPM” if redline is higher.
CAN XMIT Enable this button to transmit commands over CAN, Disable to use analog outputs.



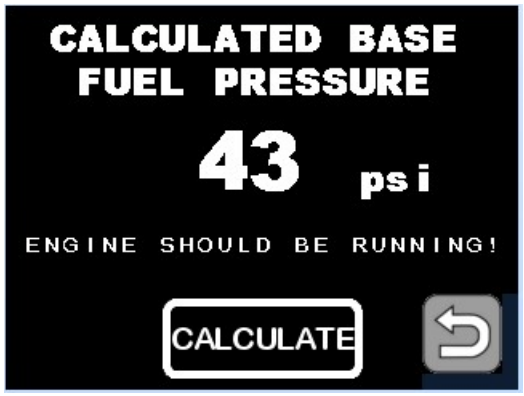
Parameter scale: Use this screen to set the maximum range for boost pressure and various temperature slide bars and graphs.
Example: You will be running a 30 psi boost target. The max boost pressure could be 35 psi to give the slide bars and graphs the best resolution. The same goes for temperatures. These values should be entered with respect to which units are selected: SI or SAE. If SI units are selected, Boost Pressure should be entered in kPa and temps should be entered in Celsius. If SAE units are selected, Boost Pressure should be entered in psi and temps in Fahrenheit.



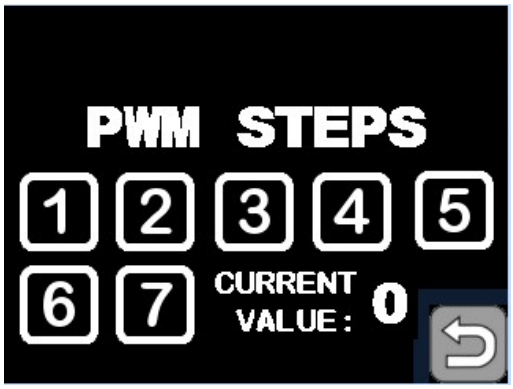
Shift Light Configuration:

Touch the gear that you wish to change the shift light RPM on. That gear number will appear above the up and down arrows for verification. Use the up and down arrows to adjust the shift light RPM set-point of said gear. Press the back arrow button at the bottom right hand corner to save the settings. The shift light should flash once the settings are saved.

Base Fuel Pressure configuration:



In order to calculate the base fuel pressure, the engine should be idling. Press the CALCULATE button and the base pressure will be calculated and displayed. This is used on the fuel screen in order to graph the fuel pressure vs. boost pressure for simple regulator function verification.



TRAC and BOOST PWM Steps:

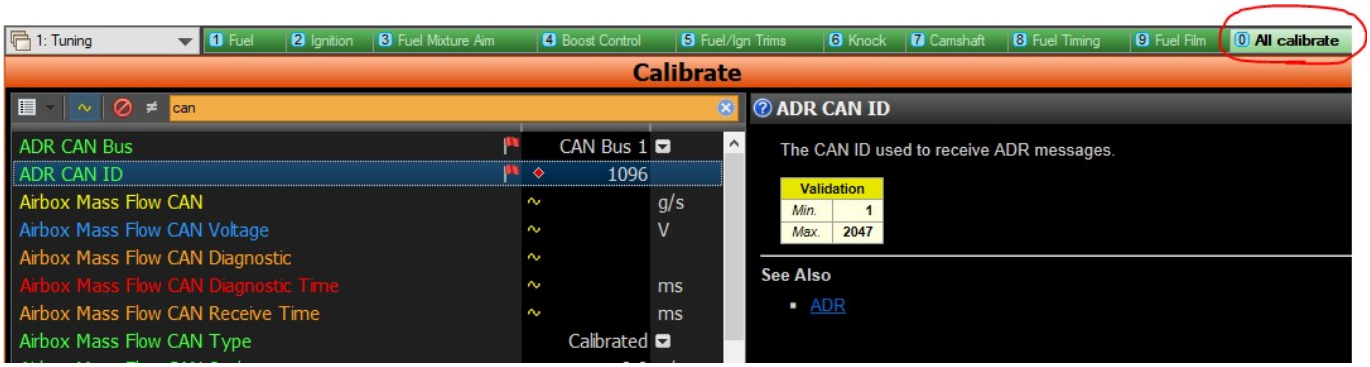
Use these two buttons to configure how many steps are to be programmed in the Infinity Tuner software for Boost and Slip. Typically the scale is from 0-5 volts and the max amount of steps allowed is 7 which give you 8 settings (0-7). Example: a value of 7 here would make each step would have a value of .71 volts. A value of 1 here would give the step a value of 5 volts. It is **imperative** to view each step in the M1 Tuner software when configuring this as there could be a potential difference with regard to

ground.
** When using the CAN XMIT, Boost PWM steps and TRAC PWM steps will determine the number of steps that are sent over the CAN bus.

**** Note that these two settings should be configured by competent personnel. Raising the BOOST too much or reducing the SLIP too much can have severe consequences. ****

Example CAN transmit configuration in M1 Tune

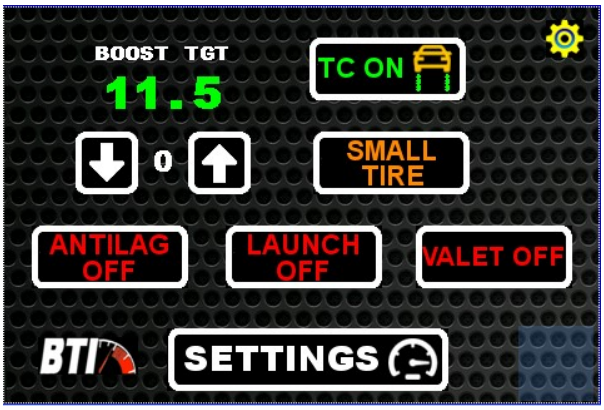
In order to transmit CAN commands over the CAN bus to the M1 ECU, the ADR CAN bus must be configured The ADR CAN ID is entered in the M1 Tune software as a decimal value.



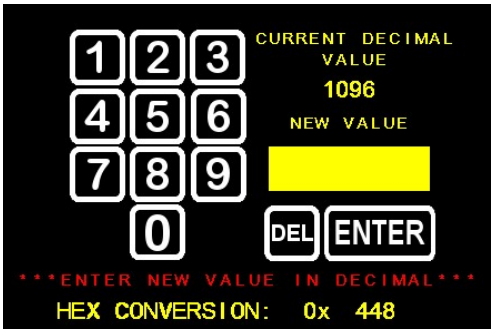
The same value must be entered into the BTI touch screen as a decimal value as well:

**Note that CAN XMIT must be enabled in the setup screen.

 Press the white cog wheel in order to enter the CAN control screen:



Press the yellow cog wheel in order to configure the ADR CAN ID



Once the ADR CAN ID is configured, the inputs for the control buttons must be configured in the M1 Tune software

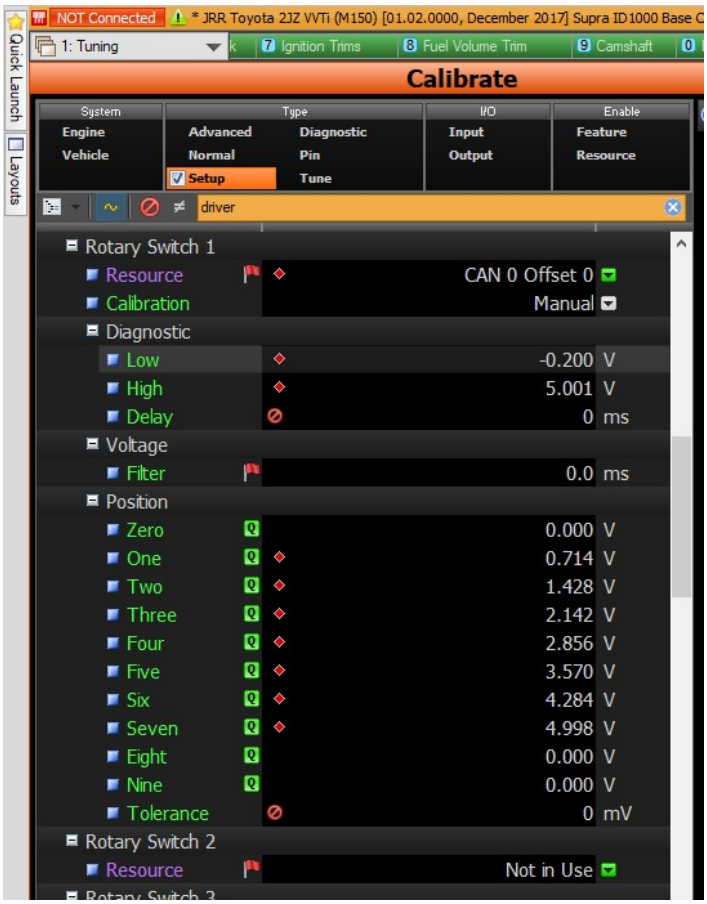
The data stream is as follows:
** All values listed in decimal**

----------"CAN 0"----------

Byte 0 (16 bits) (MoTeC offset 0)	Byte 1 (16 bits) (MoTeC offset 2)	Byte 2 (16 bits) (MoTeC offset 4)	Byte 3 (16 bits) (MoTeC offset 6)
Boost Control 0 – 5000 Divided by PWM Steps Received as 0v - 5 v	Antilag Off = 0 / On = 5000 Received as 0v or 5v	Launch Off = 0 / On = 5000 Received as 0v or 5v	Valet Off = 0 / On = 5000 Received as 0 or 5v

----------"CAN 1"----------

Byte 0 (16 bits) (MoTeC offset 0)	Byte 1 (16 bits) (MoTeC offset 2)	Byte 2 (16 bits) (MoTeC offset 4)	Byte 3 (16 bits) (MoTeC offset 6)
Trac Control / Slip Selectable for Multi-step or on / off	Tire Size Small = 0 / Big = 5000 Received as 0v or 5v	Not used	Not used



Example Boost control configuration using Rotary Switch 1.

Resource must be set to:
CAN 0 Offset 0
Diagnostic high and low must be set outside of the potential values to be expected.

Note that the CAN value comes in as a voltage and the peak voltage is 5 volts. The Boost PWM steps will determine how many positions will be used and the voltage value for each position will be the total of 5 volts divided by the number of steps.

In this example we have Boost PWM steps set to 7 so each position is worth .714 volts.

Example Tire Size configuration using Driver Switch 1.

Resource must be set to:
CAN 1 Offset 2

Warranty:

All BTI Gauges carry a 1 year warranty effective at the time of purchase.

- This warranty extends only to products distributed and/or sold by BTI Gauges. It is effective only if the products are purchased and operated in the USA. (Within the USA including US 48 States, Alaska and Hawaii.)
- This warranty covers only normal use of the computer. BTI Gauges shall not be liable under this warranty if any damage or defect results from (i) misuse, abuse, neglect, improper shipping or installation; (ii) disasters such as fire, flood, lightning or improper electric current; or (iii) service or alteration by anyone other than an authorized BTI Gauge representative.
- You must retain your bill of sale or other proof of purchase to receive warranty service.
- No warranty extension will be granted for any replacement part(s) furnished to the purchaser in fulfillment of this warranty.
- Warranty claims must be sent to sales@btigauges.com.