

Described in this document is how to setup either AEMPro v1.19 or AEMTuner v2.9 to work with the LCD Boost Controller device, and how to configure a custom parameter.

Setting up AEMPro v1.19 for Serial Telemetry.

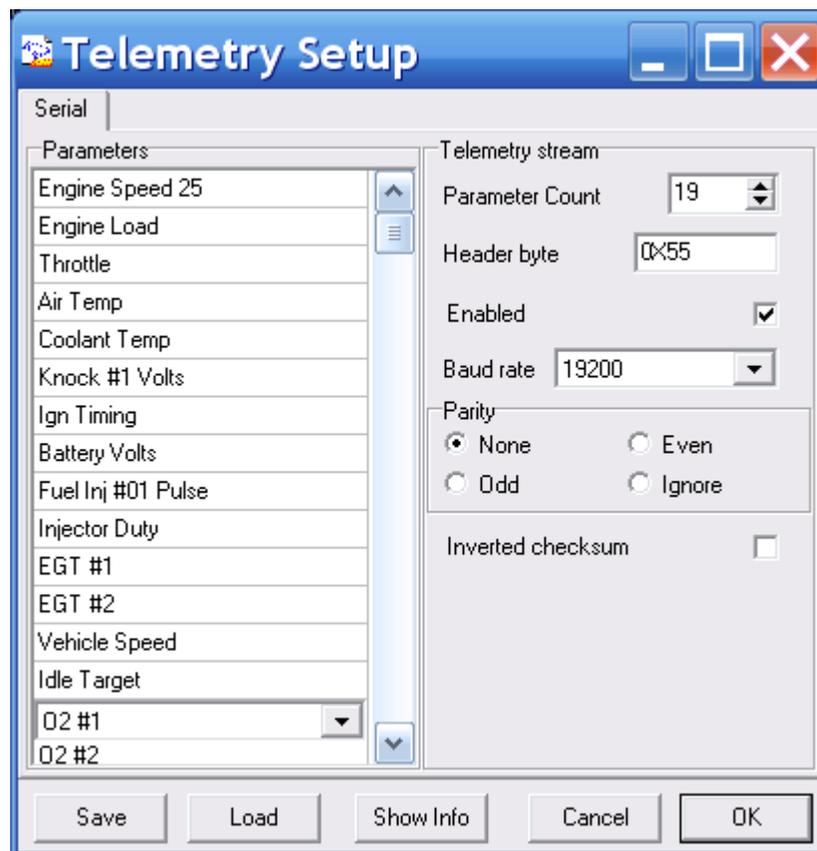
From the pull down menus, choose Setup → Advanced Setup → Telemetry Wizard.
Select AEM Serial Datastream Gauge.

Setup → Advance Setup → Telemetry Setup.

Verify Parameter Count is 19, Header Byte is 0X55, Enabled is checked, Baud rate is 19200, Parity is None, Inverted checksum unchecked.

The first 10 Parameters must be, Engine Speed 25, Engine Load, Throttle, Air Temp, Coolant Temp, Knock #1 Volts, Ign Timing, Battery Volts, Fuel Inj #01 Pulse, Injector Duty. The remaining 9 Parameters are optional, and do not have to be chosen at this time; this allows the user to choose whatever Parameters they want for Custom 001, Custom 002...Custom 009 menus on the LCD Boost Controller.

Save your work. You're done.



Setting up AEMTuner v2.9 for Serial Telemetry.

From the pull down menus, choose Wizards → Setup Wizard.

Choose Telemetry:Serial.

Choose AEM Serial Datastream Gauge (01v17 & later firmware).

Apply.

Close.

From the pull down menus, choose Tools → Configure Telemetry → Serial Telemetry.

To apply default settings, please use Setup Wizard dialog. (Wizards-> Setup Wizard)

General

Telemetry Channel: Channel 1

Checksum: Invert Checksum

Baud Rate: 19200

Byte Count: 19

Parity: None

Header Byte: 0x55

Channel 1 Data

Byte	Channel	Channel Alias
1	Engine Speed 25	
2	Engine Load	
3	Throttle	
4	Air Temp	
5	Coolant Temp	
6	Knock 1 Volts	
7	Ign Timing	
8	Battery Volts	
9	Fuel Inj 1 Pulse	
10	Injector Duty	
11	Not Set	
12	Not Set	
13	Not Set	
14	Not Set	
15	Not Set	
16	Not Set	
17	Not Set	
18	Not Set	
19	Not Set	

Show Info... Close

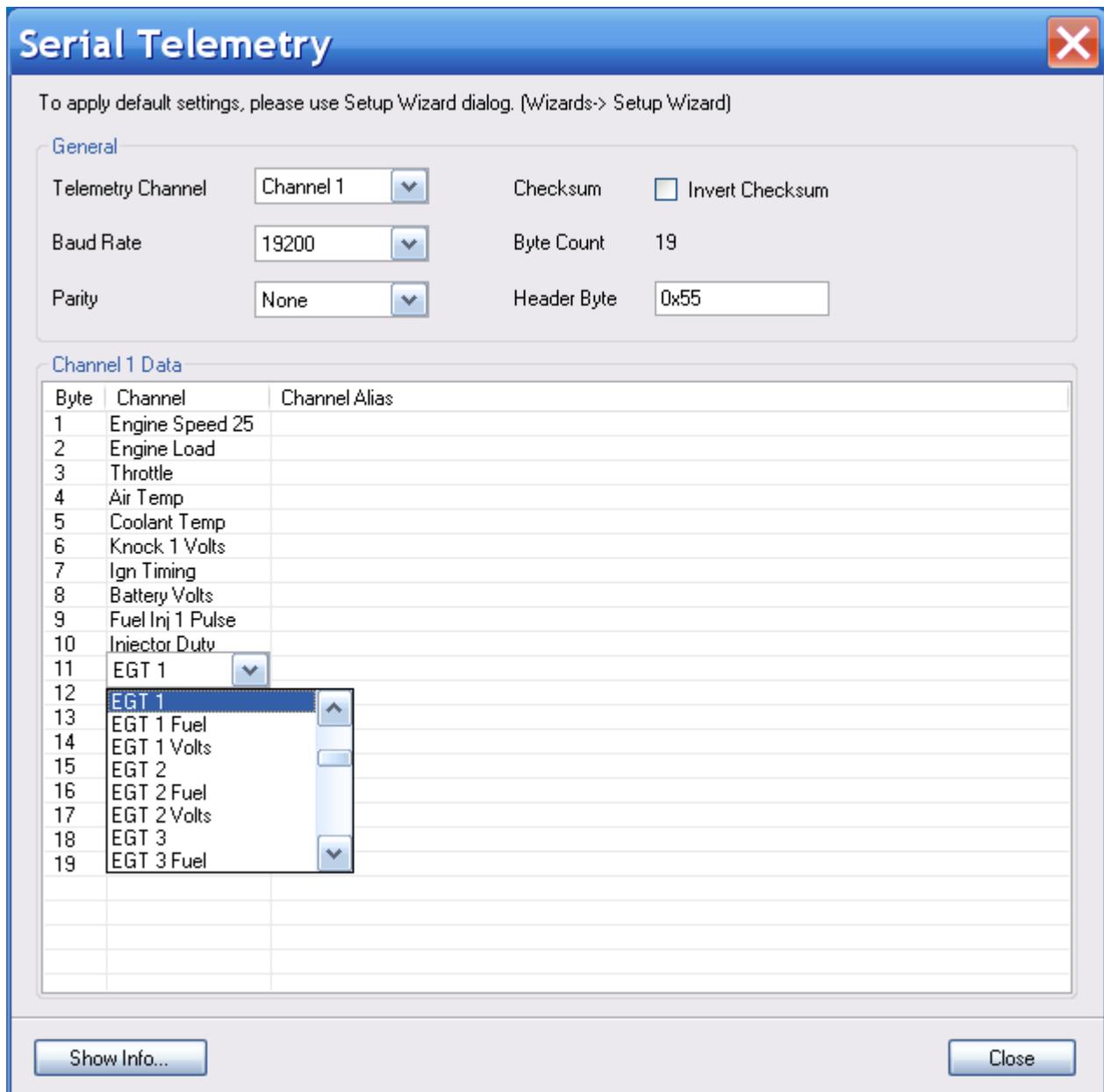
Verify Telemetry Channel set to Channel 1. Inverted Checksum is unchecked. Baud Rate is 19200. Byte Count is 19. Parity is None. Header Byte is 0x55.

The first 10 Parameters must be, Engine Speed 25, Engine Load, Throttle, Air Temp, Coolant Temp, Knock #1 Volts, Ign Timing, Battery Volts, Fuel Inj #01 Pulse, Injector Duty. The remaining 9 Parameters are optional, and do not have to be chosen at this time; this allows the user to choose whatever Parameters they want for Custom 001, Custom 002...Custom 009 menus on the LCD Boost Controller.

Save your work. You're done.

How to configure a Custom Menu (ie. Custom 001) on the LCD Boost Controller.

The first ten Bytes must not be altered or else the LCD Boost Controller will receive incorrect data and behave incorrectly. Bytes 11-19 are user selectable, a total of 9 customizable Parameters for the user. First we explore which Parameter we want from the AEM software, in this example I choose EGT 1 on Byte 11 (this corresponds to Custom 001 on LCD Boost Controller).



By clicking on the Show Info.. button, this will reveal how the data is to be interpreted.

The screenshot shows a window titled 'Telemetry Info' with a blue header. Below the header, the title 'Serial Port Settings' is displayed. A table lists various settings: Transmission Sequence (header byte, stream data, checksum byte), Header Byte (0x55), Baud Rate (19200), Parity (None), Data Size (8 bits), Stop Bits (1), Stream Size (21), Checksum (standard data sum), and Telemetry Channel (Channel 1). Below this, the title 'Serial Telemetry Data' is shown. A table with 11 columns (Byte, Name, Units, Scalar, Offset, Min, Max, Signed?, Bitmask) lists telemetry data points. At the bottom of the window, there are buttons for 'Print...', 'Copy to Clipboard', and 'Close'.

Byte	Name	Units	Scalar	Offset	Min	Max	Signed?	Bitmask
1	Engine Speed 25	rpm	25	0	0.00	6399.90	No	
2	Engine Load	%	1.34765631401024	0	0.000	99.998	No	
3	Throttle	%	0.390625	0	0.000	99.998	No	
4	Air Temp	°C	1	0	-128	127	Yes	
5	Coolant Temp	°C	1	0	-128	127	Yes	
6	Knock 1 Volts	Volts	0.019921874627471	0	0.00	5.08	No	
7	Ign Timing	°	0.351562516698323	-17.0000008074567	-17.0	72.6	No	
8	Battery Volts	Volts	0.0628480017185211	0	0.0000	16.0888	No	
9	Fuel Inj 1 Pulse	mS	0.204799994826317	0	0.0000	52.4280	No	
10	Injector Duty	%	0.976563215255737	0	0.000	249.996	No	
11	EGT 1	°C	5	0	0	1275	No	

'()' indicates alias channels.'

Byte 11 reveals to us that the answer will be returned in Degrees Celsius as unit. The data is to be multiplied or (Scalar) by a factor of 5, and the addition of 0 offset. The lowest reported value will be 0C, and maximum value reported is 1275C. The data returned is not signed (means only positive numbers for the data).

To add flexibility, the LCD Boost Controller uses fractions. Nothing to be alarmed about if you've forgotten on how to work with fractions. In almost every case, we will use the default value of 1 for Scalar Denominator and Offset Denominator.

$$\frac{\text{Scalar Numerator}}{\text{Scalar Denominator}} + \frac{\text{Offset Numerator}}{\text{Offset Denominator}}$$

Scalar Numerator = 5

Scalar Denominator = 1 (default value on LCD Boost Controller).

Offset Numerator = 0 (default value in LCD Boost Controller).

Offset Denominator = 1 (default value in LCD Boost Controller).

- (1) Enter the setup config menu on the LCD Boost Controller by holding down the push button on the rotary encoder while simultaneously powering up the device (let go of the button after entering).
- (2) Because we are interested in only Custom001, we can skip over “Custom1 Selected” menu screen.
- (3) Edit the Custom 001 screen and change it to EGT 1. This will now display EGT 1 from now on.
- (4) Find the Scalar Numerator menu, and change this to 00005.
- (5) We are done because the remaining defaults are correct (positive Scalar value, positive Offset value, Signed=No).

Changing the EGT from reporting Celsius to Fahrenheit Exercise.

The formula for changing C to F is:

$$9/5 + 32$$

Scalar Numerator is 9
Scalar Denominator is 5

Offset Numerator is 32
Offset Denominator is 1

We already have Scalar Numerator value of 5 from our EGT example. We need to multiply these two Scalar Numerators together, $5 \times 9 = 45$, this is our new Scalar Numerator value we use.

Scalar Numerator = 45 (enter this as 00045)
Scalar Denominator = 5 (enter this as 00000005)

Offset Numerator = 32 (enter this as 00032)
Offset Denominator = 1 (enter this as 00000001) default

That is all that needs to be done to convert C to F.

As you may have already noticed, the denominator have more more leading zeros than the numerator and wondering why. This is so you can input small decimal numbers.

ie. 3.14 should be entered as:

Numerator = 314
Denominator = 100

ie. 0.0012345
Numerator = 12345
Denominator = 10000000

It's best to use a calculator to verify your answers when dealing with so many zeros.