ACAS-X

FOR MAXXECU

BY DRAGDYNAMICS.COM

INSTALLATION AND CONFIGURATION

DISCLAIMERS, TRADEMARKS, WARRANTY

Drag Dynamics is not affiliated with MaxxECU – we just like using their products and developing complementary parts for their Engine Control Systems.

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Parts Included

1 – ACAS-X Sensor Module
1 – 4' Wire Harness, DTP Connector assembled – Flying Leads

Operation:

For use with MaxxECU systems only. See "Requirements" section for minimum supported firmware versions.

Chassis Angle

The ACAS-X channel 1 output shows Chassis Angle – also known as Pitch. This is the absolute angle of the chassis, unaffected by acceleration or roll (up to 30* roll angle). It uses "fusion data" to give the most accurate position

Pitch Velocity

Pitch Velocity is the Chassis Angle RATE OF CHANGE – If your car is optimized for tracks where a wheelie is a potential problem, Pitch Velocity lets you see the problem long before the chassis angle is too high to do anything about it – potentially saving both a pass, and thousands of dollars of damages from hard landings. This is output on Channel 2.

Linear Acceleration

Channel 3 transmits Linear Acceleration. This is the typical "X-Axis" raw data, from the onboard G-Meter. It will be affected by the vehicle's pitch angle during a pass, but it's what most are used to seeing, therefore we included it in the ACAS-X.

Corrected Linear Acceleration

Channel 4 reports a Corrected Linear Acceleration value. This channel is similar to X-Axis on a typical G-Meter, minus the effects of chassis tilt, gravity, and vibration that causes normal X-Axis accelerometer data to become inaccurate or unusable. This helps with pass-to-pass repeatability regardless of chassis angle, surface preparation, etc. This is very useful to measure true acceleration values in cars that require large chassis angles for best performance.

General Information and Use:

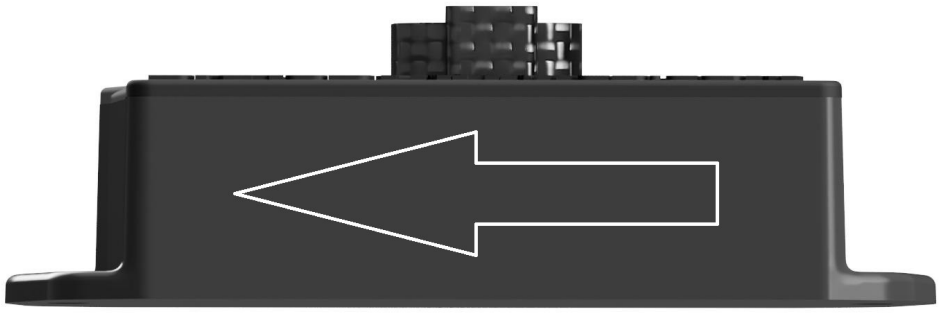
Power Consumption: The ACAS-X uses 5 volt power and sensor ground directly from your MaxxECU, just like any other 5v sensors. This unit consumes no more than .003 amps (30 milliamps) during use.

Performance: The ACAS-X samples chassis orientation and movement at 400khz, and generates CAN data packets at 100 samples per second, the fastest a Holley can receive and store CAN data. This results in a time of .008 seconds between sensor measurement and delivery to your ECU.

Wiring and Installation

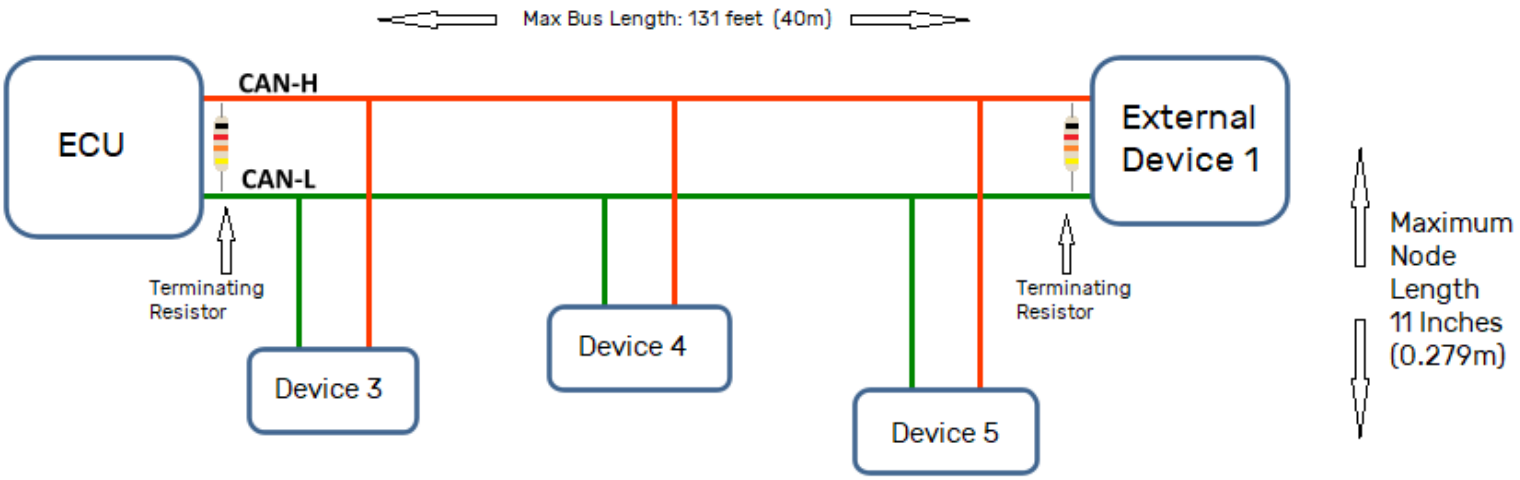
Mounting: Mount the ACAS-X module on a horizontal surface in your vehicle chassis with the text/top facing up. The arrow on the top of the module must point in the forward direction the car travels during racing. The Lid must be facing UP (the sensor cannot be installed upside-down). The sensor can be mounted just about anywhere relatively flat and level.

The ACAS-X needs to be "zero'd" before use. There are 2 options for zeroing the system: (1) Each time power is applied (ECU power up), and (2) whenever the system detects a trigger from the Holley Outputs that is easily configured in your I/O (Outputs) ICF. The closer you have it mounted level in your chassis, the better. The mount can be rigid – unlike other inertia measurement systems, this one will filter high frequency noise from chassis vibrations. The unit can be mounted anywhere temperatures won't exceed 170* F continuous. The unit operates reliably in temperatures as low as 45* F continuous, and uses internal temperature compensation.



CAN Bus Layout

CAN bus performance is **dramatically** affected by noise problems unless laid out per the following diagram. It's very easy to have a non-compliant layout in your car, be sure to keep your node lengths shorter than 11" and have a **terminating resistor** in or at the devices at each end of the chain. Your ECU is usually terminated internally, and some devices (such as Holley Dashes) are also terminated. The way to confirm correct termination is by measuring the resistance (Ohms) between CAN HI and CAN LO, it should read 120 ohms with power OFF when properly terminated.



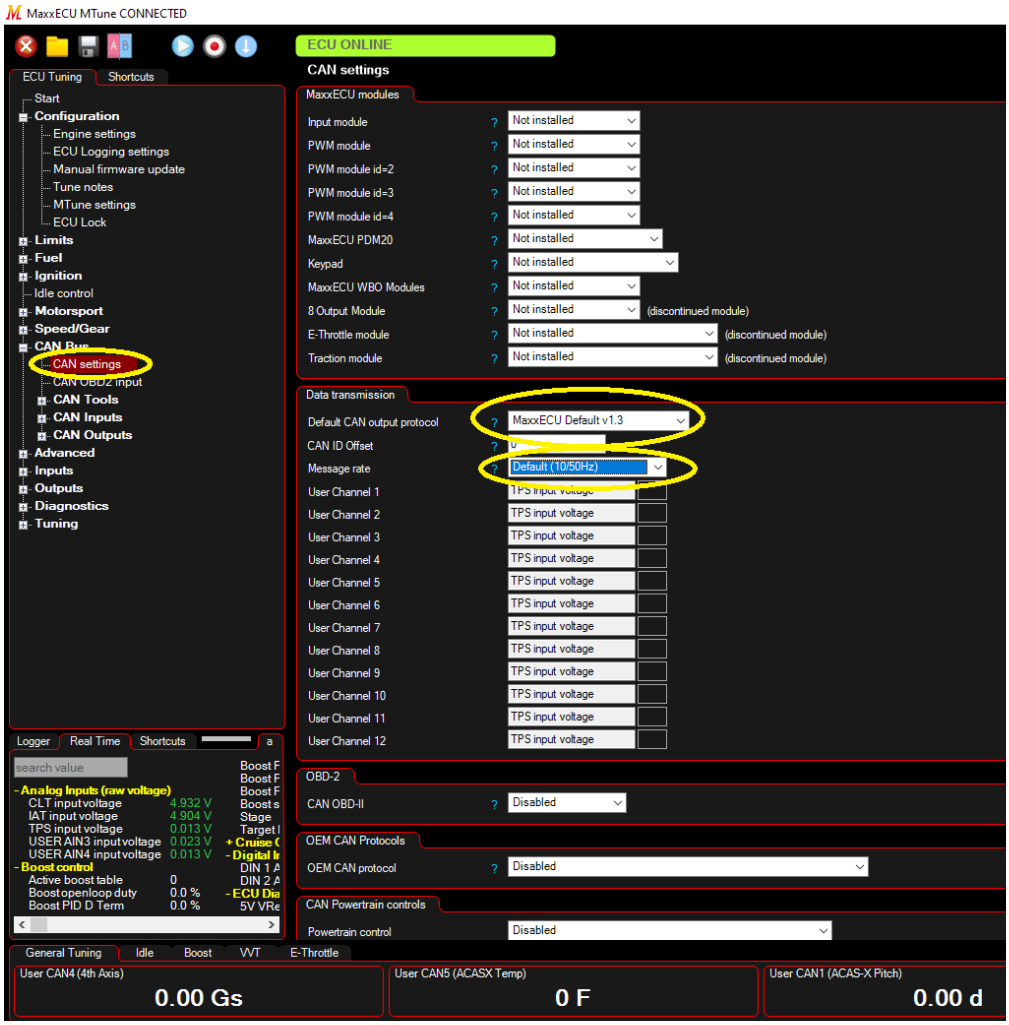
Wiring:

Pin:	Color:	Function:
1	YELLOW	+5v Power from MaxxECU VREF +5v circuit. **DO NOT CONNECT TO +12v IGNITION POWER**
2	Black	Ground – attach to MaxxECU Sensor Ground circuit. **DO NOT CONNECT TO CHASSIS OR BATTERY GROUND**
3	Orange	CAN Bus Low. Connect to MaxxECU CAN Low
4	Orange/Blk	CAN Bus High. Connect to MaxxECU CAN High

MTune Configuration:

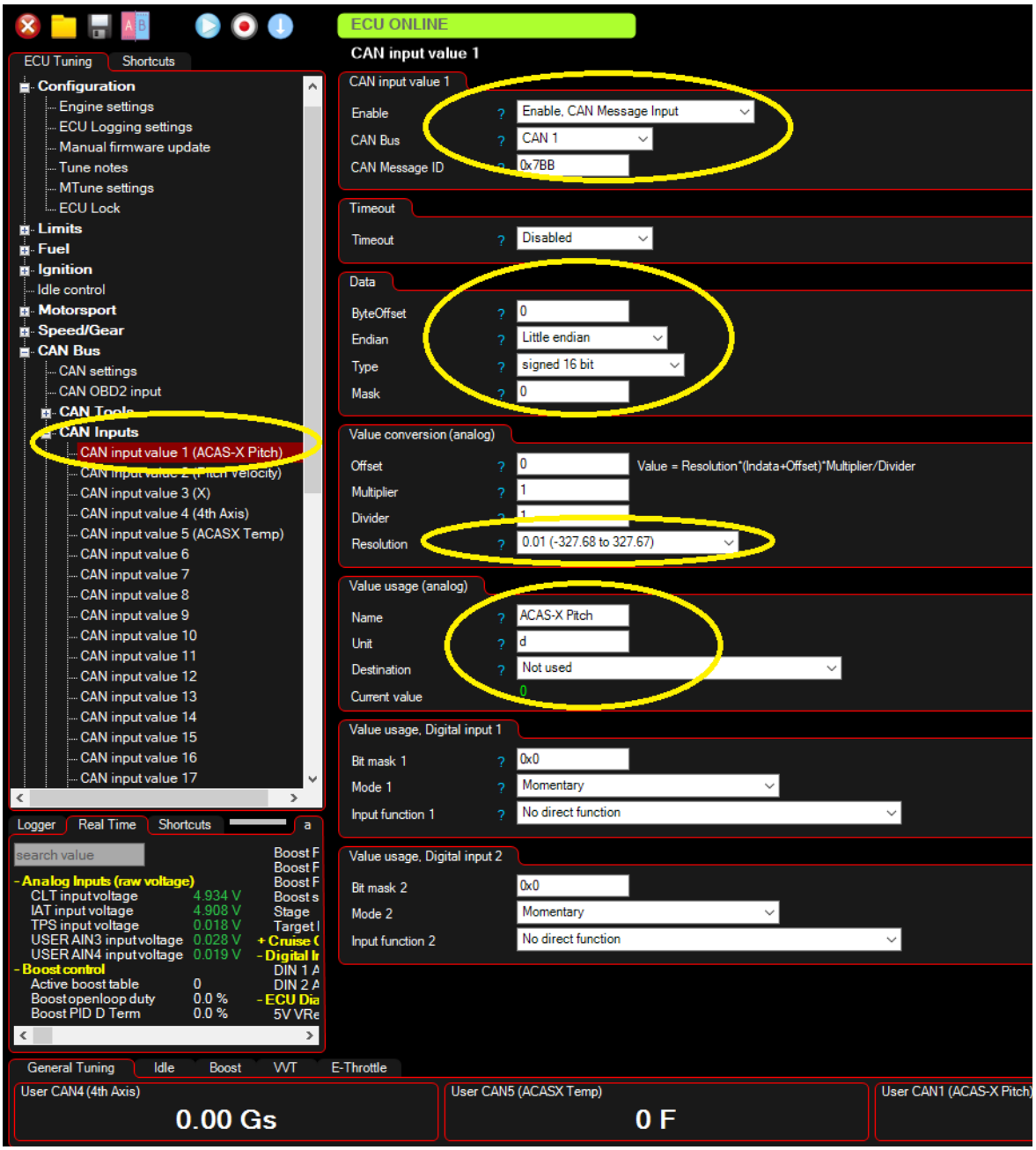
CAN Bus Configuration:

Open the calibration (from file, or from the ECU itself) that you want to configure for ACAS, and select CAN Bus, CAN settings and set Default CAN output protocol to MaxxECU Default v1.3. Set the Message rate to Default (1050hz). See image below



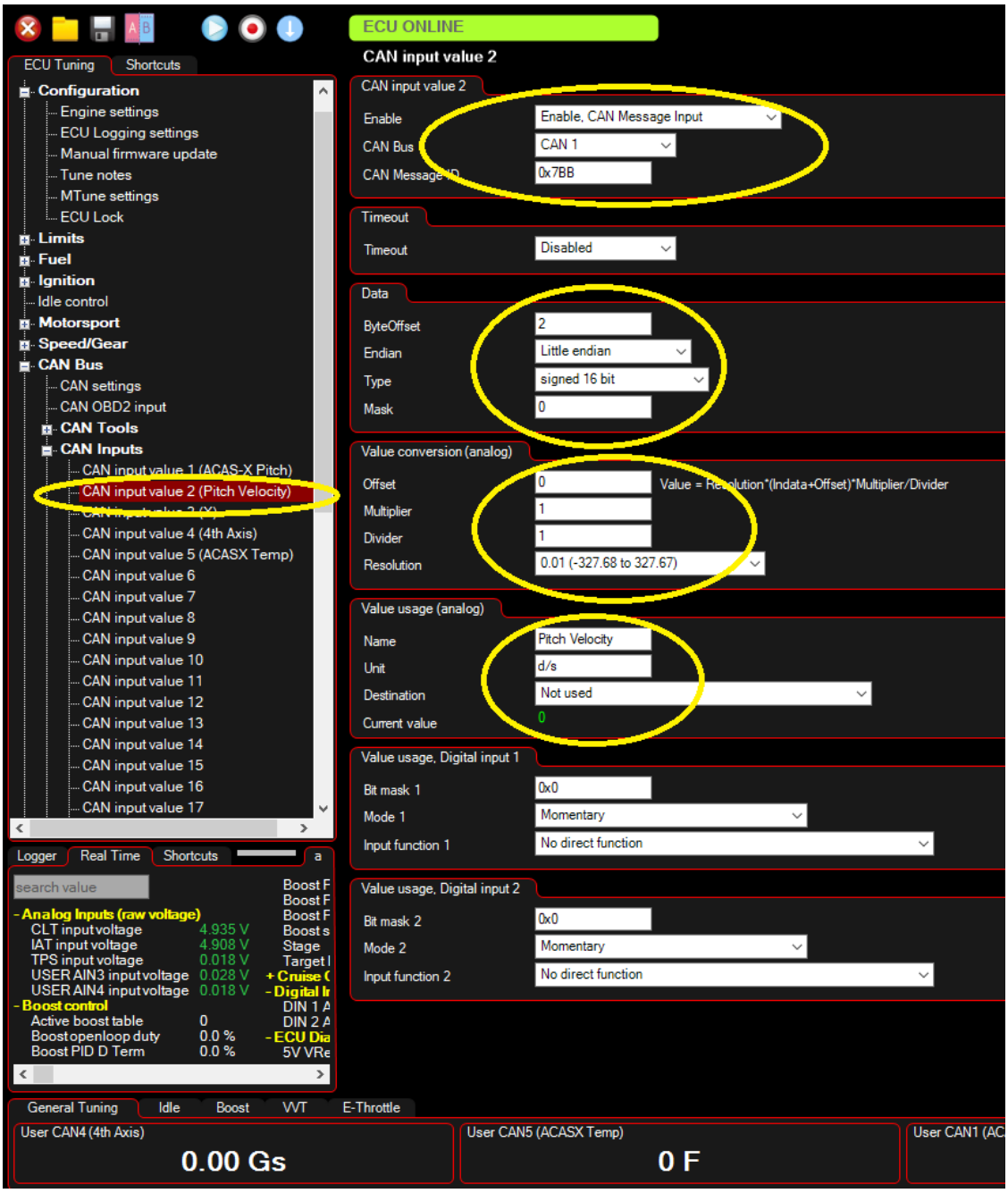
Chassis Angle Channel Configuration

Next, select from CAN Inputs, your first available CAN input value and configure the Message ID, Data, Value Conversion and Value Usage categories as seen in the next image:



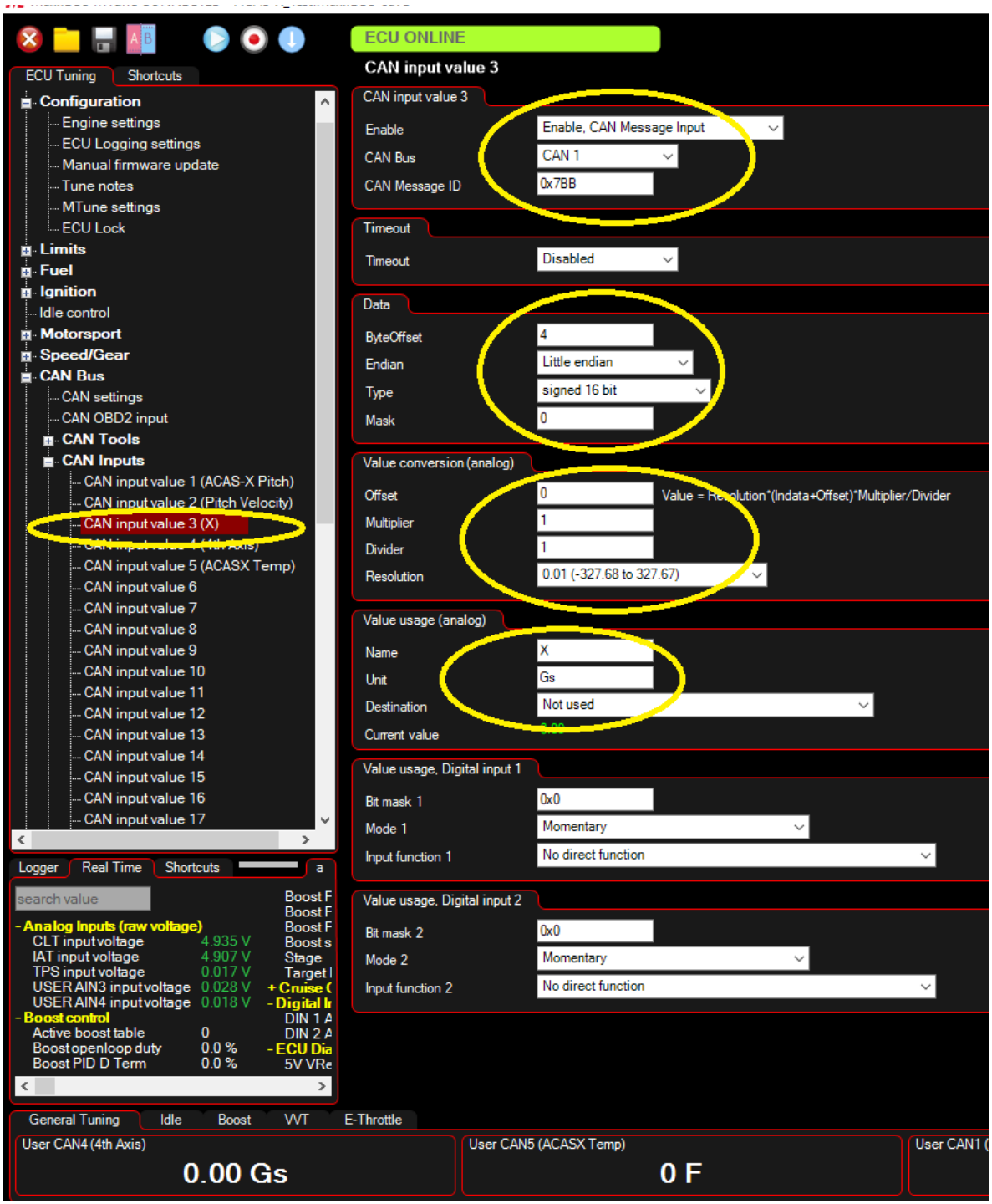
Pitch Velocity Channel Configuration

Using the next available CAN input value (left column), configure the Pitch Velocity channel as follows:



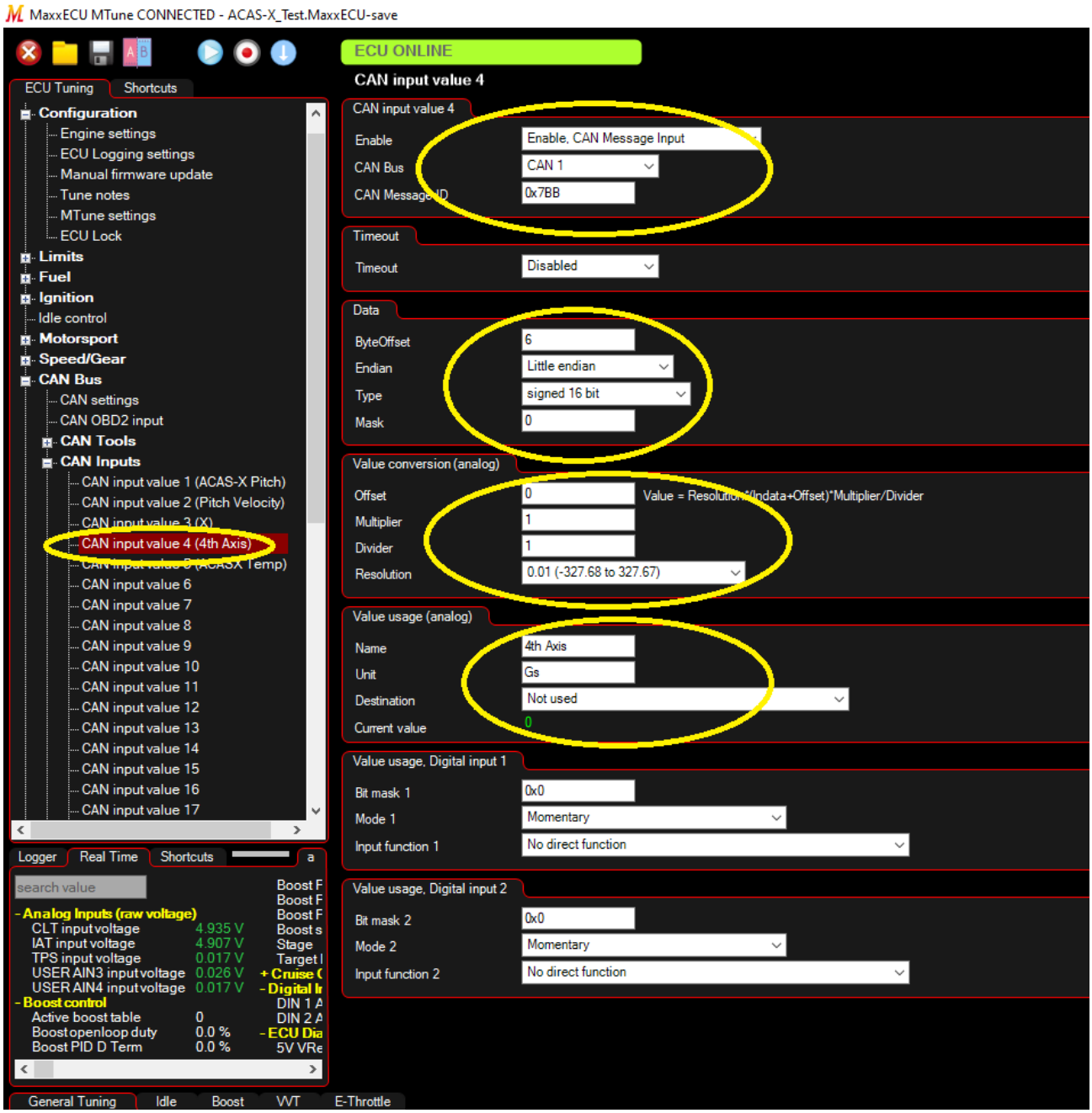
X-Accel Channel Configuration

Using the next available CAN input value (left column), configure the X-Accel channel as follows:



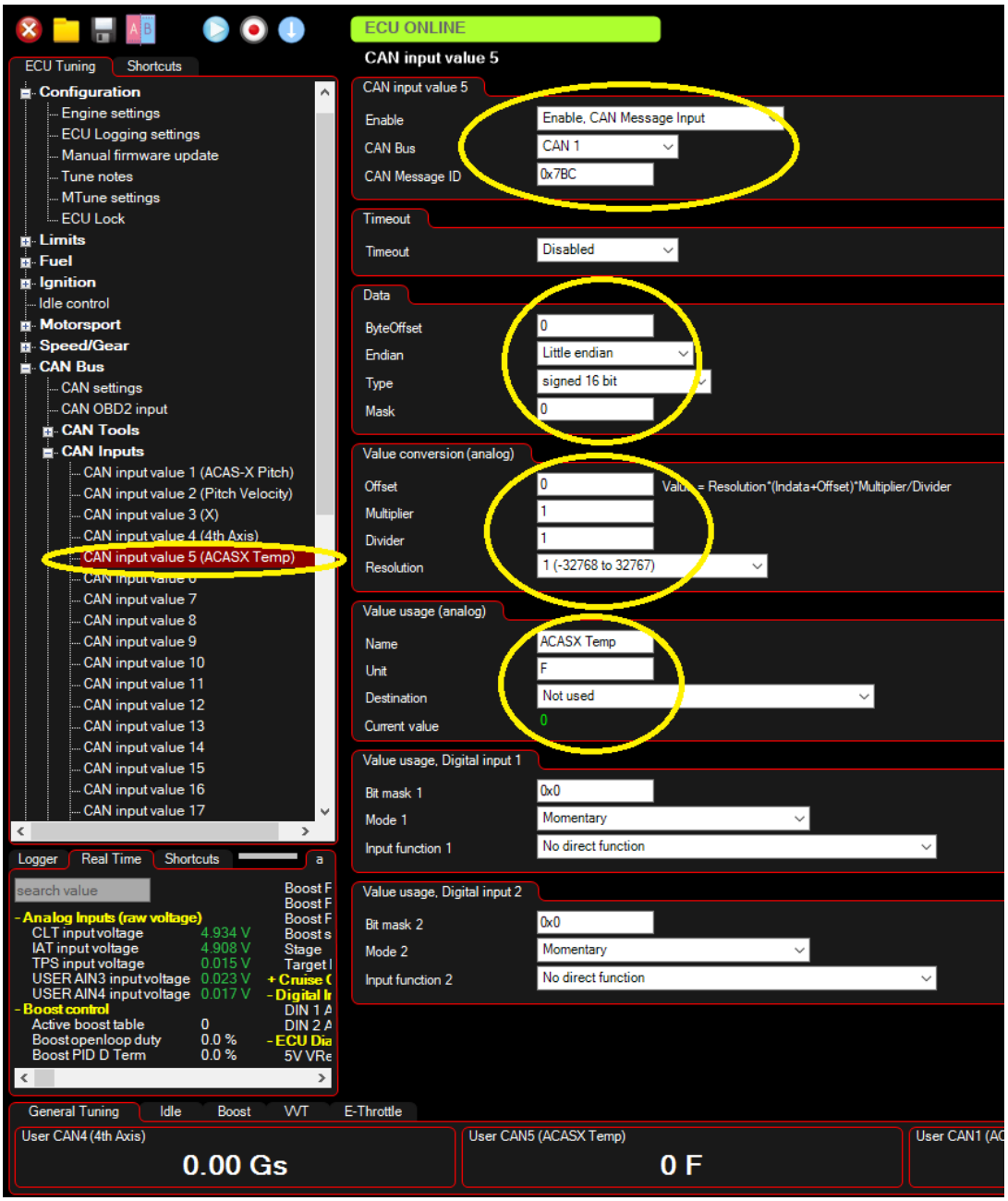
Corrected X-Accel Channel Configuration:

Using the next available CAN input value (left column), configure the X-Accel channel (4th Axis) as follows:



OPTIONAL: ACAS Temperature Channel

Although it's not necessary, we've included an ACAS temperature channel in the ACAS CAN broadcast data in case you'd like to monitor it. Using your next available CAN Input Value (left column), set up your ACAS Temperature Channel as follows:



Zeroing the Sensor, and the Zero Modes

Your ACAS-X sensor automatically zeros itself when powered up. However, you may want it to zero just before launching the car (using a trans brake input, or clutch switch, for example).

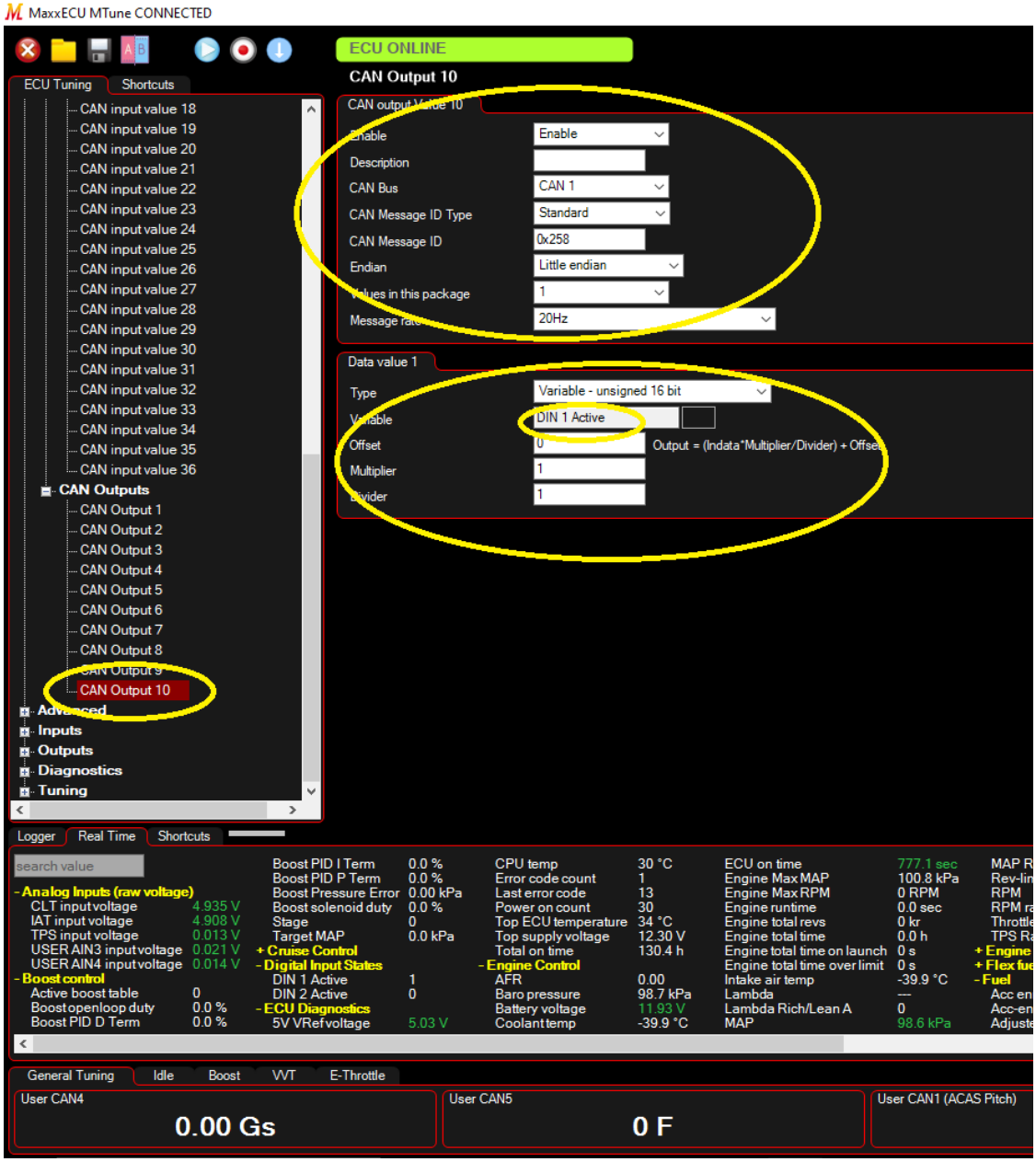
By default, the ACAS-X automatically every time the Holley ECU powers up. Optionally, it can be zero'd whenever the ACAS-X detects an event triggered by the Holley ECU over CAN Bus.

AutoZero

ACAS-X will automatically zero the chassis angle every time power is applied (ignition on) to the Holley ECU. This works great for cars with changing ride heights, BUT it can be a problem if the car is started in staging lanes that are on an incline.

Triggered Zero

This method will read a “trigger” via CAN Bus from the MaxxECU, preferably when a trans brake or clutch switch is depressed (but it can be triggered off any event available in the Holley ECU). How this works is by configuring a CAN Output as shown in the next image. We chose CAN Output 10. This will send a “Zero” command to the ACAS whenever your DIN1 input becomes Active. Most drag racers will tie this to their Launch button, triggering a zero when the button is pressed.



Testing Triggered Zero mode

To see if the Triggered Zero mode is functioning, watch the Blue LED light on the ACAS: it will go dark for 1 second every time it receives a “Triggered Zero” packet.

If you have difficulty setting this up or troubleshooting, email us at support@dragdynamics.com and we’ll get on the phone/remote with you and help you get it working.

CAN Bus Tuning and Performance

Its a good idea to make sure your CAN bus networks are performing their best, so here are some things to consider:

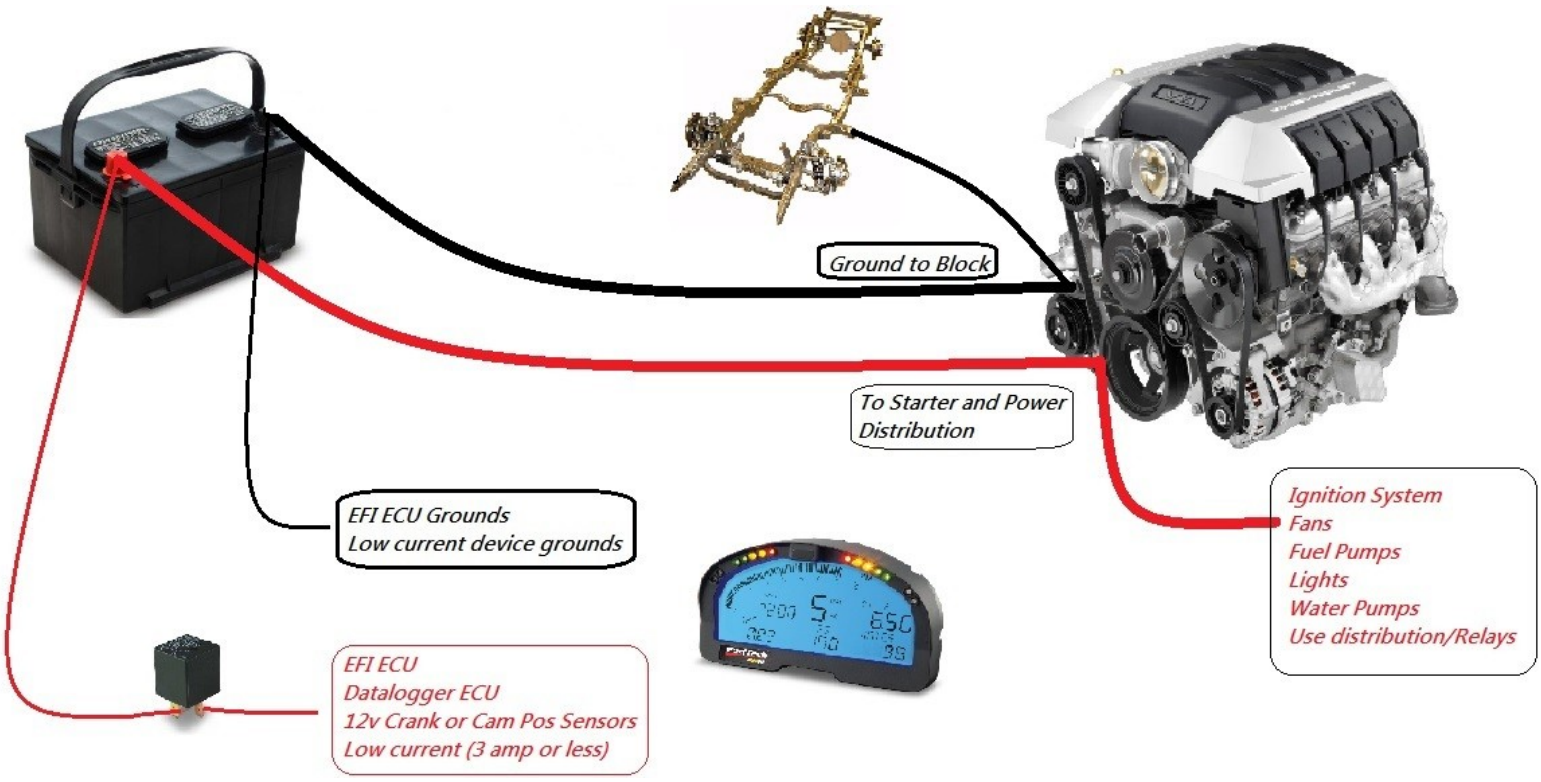
CAN Bus Termination: measure the **resistance** (the Ohms option on your meter) of the CAN bus wires while all sensors are installed and wired, but NOT powered on. The ideal resistance for a CAN network, is 60 ohms. Measure this by probing both CAN bus wires and observing the resistance. If the bus measures 120 ohms or higher, it's time to install another terminating resistor. Most ECU or CAN device manufacturers/retailers sell them, or you can easily install a 120-ohm, ¼ watt resistor across the two CAN wires.

Make sure your node lengths are within specification (maximum 11" for CAN speeds 500kb/s-1000kb/s). It's a good idea to use twisted pair, or manually twist your CAN pair to reduce electrical noise that can interrupt/slow CAN traffic. We've even see Ferrite Cores that snap over your power and CAN wires that reduce or eliminate noise.

CAN Bus Tuning and Performance (ctd)

Chassis Power and Grounds

If this is a race / offroad or engine swap vehicle, try to arrange your power and grounds such that high current and low current devices have their own paths to battery (both positive and ground), as drawn in the image below. This separates devices that leave noise signatures on their power and grounds, from devices that are sensitive to that noise.



Dragdynamics.com Product Warranty

Limited 3-Year Warranty

Congratulations on your purchase of an ACAS-X! We stand behind the quality of our products and are pleased to offer you a limited warranty against manufacturer defects and problems. Please read the following terms carefully.

Warranty Coverage: Drag Dynamics, LLC ("the Company") warrants that your ACAS-X (the "Product") is free from defects in materials and workmanship for a period of three (3) years from the date of purchase, provided that the Product is used under normal conditions and for its intended purpose.

Scope of Warranty: This warranty covers any defects or malfunctions arising from the manufacturing process or materials used in the Product. The Company will, at its discretion, repair or replace the defective Product or parts, or provide a refund, within the warranty period.

Original Purchaser Coverage: This warranty is applicable only to the original purchaser of the Product and is non-transferable. To be eligible for warranty service, the original proof of purchase must be presented.

Exclusions: This warranty does not cover damage resulting from:

- Accidents, misuse, or abuse
- Unauthorized modifications or repairs
- Acts of nature, such as lightning, floods, earthquakes, etc.
- Normal wear and tear

Obtaining Warranty Service: If you believe your Product is defective and covered by this warranty, please email *support@dragdynamics.com* for instructions on how to proceed with the warranty claim. The Company reserves the right to require proof of purchase and may ask for the defective Product to be returned for inspection.

Limitation of Liability: To the extent permitted by law, the Company's liability under this warranty is limited to the repair, replacement, or refund of the Product, and shall not exceed the purchase price paid for the Product.

No Other Warranties: This warranty is the sole and exclusive warranty for the Product, and no other warranties, express or implied, are made, including any warranty of merchantability or fitness for a particular purpose.

Effective Date: This warranty is effective as of the date of purchase and is valid for three (3) years.

Thank you for choosing Drag Dynamics, LLC. We appreciate your trust in our products.