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PCS D200 DASH LOGGER USER GUIDE v2.0

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PCS D200 Dash Logger User Guide

1 Introduction

The D200 Dash Logger is a powerful combination of high speed data logging and a graphical touchscreen LCD providing a complete vehicle monitoring and data logging system.

Thank you for purchasing your new D200 Dash Logger. Please check the contents of thepackage. You should have received the following items:

- D200 Dash Logger
- Software CD
- Wiring Harness
- USB A to mini B cable

1.1 Overview

The D200 Dash Logger standard features include:

- 2MB Data Logging Memory
- Touchscreen Interface
- RS-232 Communication with Pass-Through
- Dual CAN 2.0B Interfaces
- 8 Analog Inputs
- 2 Speed Inputs
- 2 PWM Outputs
- On-board logging up to 100 times per second

1.1.1 On-Board Inputs and Outputs

The D200 Dash Logger has 8 analog inputs, 2 speed inputs, and 2 PWM outputs. The analog inputs can be wired to any 0-5 VDC sensor. The calibration of voltage to function is programmable on a 16-point table from the software. The analog input can be configured as one of the following types of inputs.
• Voltage

- Percentage
- Data Log Enable
- Lambda
- Night Mode
- Position
- Pressure
- Temperature
- Disable Touchscreen
- Timing Beacon

When the input is defined in the software, the user has the ability to rename the input to a more specific name such as renaming Analog 1, to Fuel Pressure. This detailed name will be used throughout the software and will be used in the data log software. For monitoring the input on the screen, a four letter word or acronym can be used such as FPRS for fuel pressure. In some cases a gauge can be chosen to match the resolution of an input. For example, if there are two pressure inputs, one of which will reach a maximum of 95 PSI and the other will reach a maximum of 2350 PSI, then the gauges 0-100 PSI and 0-2500 PSI can be assigned respectively.

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In the case of pressure, the user can also select if the pressure is gauge or absolute. Pressure measured in gauge means atmosphere pressure is equal to 0 kPa or 0 PSI. Pressure measured in absolute means atmosphere pressure is equal to 14.7 for PSI and 101 for kPa. The units used for displaying a particular input are set by the particular function. Unit changes, such as from Celsius to Fahrenheit, are global and will take affect on all temperature defined inputs.

The speed inputs can be defined as one of the following types on inputs.

- Frequency
- RPM
- Vehicle Speed

Similar to the analog inputs, the speeds can be given a more specific name and gauge.The dash's pulse-width modulated (PWM) outputs are high side (+12VDC) drive outputs. These can be used for any of the following functions.

- Shift Light
- Output vs. Generic 16x16 Table
- Alarms
- Screen Override

1.1.2 Serial Communication Overview

Serial communication, also referenced as RS232, is used to connect serial devices to the dash. This includes many after market engine management systems and the Garmin 5Hz GPS. Serial devices currently supported by the dash include:

- AEM
- Autronic SMC, SM2, and SM4
- Electromotive TEC2 and TEC3
- FAST™ 1st Generation ECU
- Garmin 5Hz WAAS Enabled GPS
- Innovate Wideband
- Microtech

Only one serial device can be connected to the dash at a time. To connect a serial device with a standard 9-pin DB9 port, you must purchase the Serial ECU Connection Kit.

Serial devices are connected to the dash using a 9-pin circular connector to the Serial connection kit to the harness that connects to the back of the dash. If communication is needed to the serial device using the manufacturer's software, disconnecting the serial cable between the serial device and the dash is not necessary. Instead, the dash offers a Pass-Through Mode that allows communication between a computer and the serial device. Pass-through mode connects the serial port on the side of the dash with the serial device connected at the back of the dash. In this mode, the dash acts as an extension wire, and the dash does not see the data transferring between the computer and the serial device. This mode is selected Using the Communications button then selecting RS-232 from the Main Menu.

1.1.3 Controller Area Network (CAN) Overview

The Controller Area Network (CAN) is a high speed communication bus designed by Bosch as a reliable network to withstand the harsh automotive environment. The following devices are currently supported.

- PCS Transmission Controller
- PCS Xtended Fuel Controller
- PCS Accelerometer Module
- PCS Exhaust Gas Temperature (EGT) Module x 2
- FAST™ XFI™ Engine Controller
- Dash Logger Expansion Module
- Motec M400, M600, M800, M880

Unlike serial devices, multiple CAN devices can be placed on the same bus. The dash has two CAN buses; CAN A and CAN B. Devices can be connected to either bus, but tuning of the PCS Transmission Controller can only be performed from CAN A. When connecting CAN devices, the device must tee-in to the CAN high and CAN low wires. A termination resistor must be present at both ends of the bus. PCS offers several kits for easy CAN connections.

This Help section will guide you along step-by-step through the installation and tuning processes. If for any reason you cannot find the information you're looking for we are easily contacted through email at support@powertraincontrolsolutions.com or by phone at 1-804-227-3023. We are available Monday through Friday from 9am to 5pm EST.

As part of our ongoing product improvement efforts, the Help files contained herein will continually be updated to provide as much information as possible to make this guide an easy to follow, user friendly resource. Updates can be found on our website at http://www.powertraincontrolsolutions.com.

2 Hardware and Wiring Installation

2.1 Location and Mounting

The D200 Dash Logger has two 1/4-20 bolt holes on the back. These can be used for either flush mounting the D200 Dash Logger to a dash, or for using an adjustable rigid mount such as those typically used for mounting audio/video equipment.

The D200 Dash Logger mounting location is determined by the application, but generally it is visible to the driver. A small visor can be mounted over the screen to aid in visibility in direct sunlight conditions. The viewing angle will also affect how easily the screen can be read. This must be taken into consideration when mounting the dash. The contrast setting will change the visibility of the screen for a certain viewing angle. The contrast is adjusted automatically with temperature, but it can also be changed using the touchscreen or the software to help optimize the visibility for a particular viewing angle.

The screen is sealed to condensation that may occur due to temperature changes, but the unit is not fully water sealed and should be mounted in a dry location.

NOTE: Care must be taken to use the correct length screw or bolt when mounting the D200. A bolt or screw that is to long could damage the D200

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2.2 Wiring

Pin #	Wire Color	Function
1	Red	Power (Switched +12 VDC)
2	Not Used	Reserved
3	Not Used	Reserved
4	Not Used	Reserved
5	Not Used	Reserved
6	Not Used	Reserved
7	Violet/Black	PWM 1
8	Violet/Red	PWM 2
9	White/Red	CAN A High
10	Not Wired	CAN B High
11	Not Wired	CAN B Low
12	Brown/Black	RS-232 Transmit
13	Brown/Red	RS-232 Receive
14	Brown/Blue	RS-232 Ground
15	White/Black	CAN A Low
16	Orange/Black	Speed Input 1
17	Orange/Red	Speed Input 2
18	Gray/Black	Analog Input 1
19	Gray/Red	Analog Input 2
20	Gray/Light Green	Analog Input 3
21	Gray/Light Blue	Analog Input 4
22	Gray/White	Analog Input 5
23	Gray/Orange	Analog Input 6
24	Gray/Yellow	Analog Input 7
25	Gray/Pink	Analog Input 8
26	Red/White	Reference 5V Output
27	Black/White	Sensor Ground
28	Black	Ground

2.2.1 Power and Ground

The D200 Dash Logger requires a fused, switched, power connection from 9VDC to 18VDC. The dash draws approximately 0.4 amps without the PWM outputs turned on. If the PWM outputs are used to drive a device such as a shift light, the power requirements for the dash will increase accordingly. The dash harness is equipped with a 10-amp inline fuse and switched power should be connected to the red wire coming from the fuse holder. Ground should be connected to the black wire coming out of the harness with the fused power wire.

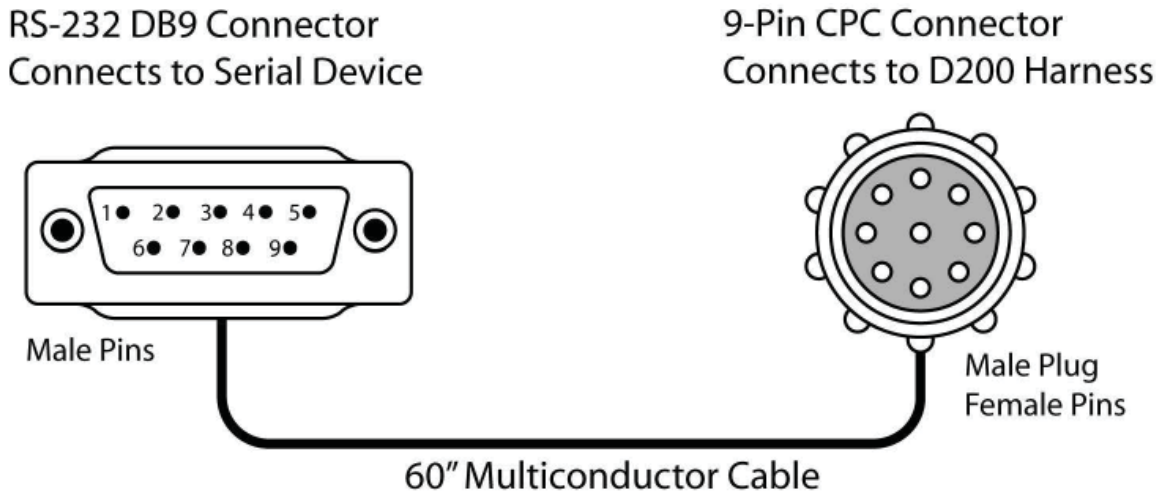
2.2.2 On-Board Inputs

The D200 Dash Logger has 8 analog inputs and 2 speed inputs. The analog inputs can be connected to any 0-5V sensor. If a sensor requires a 5V reference voltage, use pin 26, red/white, for a regulated +5V DC source. For a sensor ground source, use pin 27, black/white. Analog inputs 7 and 8, pins 24 and 25 respectively, have programmable 1000-ohm pull-up resistors in the dash. These are typically used with a temperature sensor but must be disabled for use with a typical 5V sensor. This pull-up may be enabled in the software.

The speed inputs, pins 16 and 17, can be connected to a magnetic or hall-effect sensor. The speed inputs have programmable 1000-ohm pull-up and pull-down resistors in the dash to accommodate a wide range of sensors.

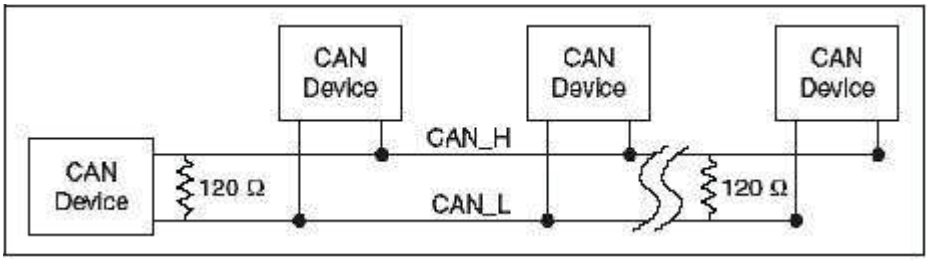
2.2.3 On-Board Outputs

The D200 Dash Logger has 2 PWM outputs. These are high side (+12V) outputs capable of driving a constant current of 6-amps each or a peak current of 30- amps. The power connection must be able to source the required power for the outputs.



The D200 Dash Logger has one RS-232 serial connection typically used for connecting to an aftermarket engine controller or GPS receiver. The RS-232 connection is on the back 28-pin circular connector and comes out of the harness on a 9-pin circular connector. For connecting to a device with the normal 9-pin DB9 connector, the purchase of the ECU connection kit is required. The 9-pin DB9 connector on the side of the dash is only used for pass-through communication and can not be used to connect an RS-232 device to the dash.

2.2.5 Controller Area Network (CAN)



The D200 Dash Logger has two CAN interfaces, CAN A and CAN B. Both receive CAN information, but only CAN A can be used to tune the PCS Transmission Controller. CAN A is a two wire (White/Red and White/Black) twisted pair connected to a 2-pin Deutsch connector on the dash harness. For CAN communication, both wires must be connected to the device and a terminating resistor must be at each ends of the harness. Multiple devices can be connected on the same CAN network if the devices communicate at the same speed.

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3 Software Installation

A software CD is provided with every D200 Dash Logger purchase. If a software CD was not shipped with the dash or if a replacement CD is needed, please contact PCS Technical Support. The newest revision of the software is available from our website. Load the software CD into the CD drive. A window should appear offering several options, click “Install Software.” If this menu does not appear, open the CD with Windows Explorer or MyComputer. Double click the file D200-CD.exe to begin installation. An installation window will appear with the D200 Dash Logger software version number, click next. A window will appear with the intended installation directory, it is possible to change the installation directory but using the default directory is strongly recommended. Once the directory has been chosen, click next. A window will appear offering a selection of installed components from a list. The software installation will allow the ability to select or deselect manuals and optional components. Select the preferred components for installation and click next. A window will appear with the start menu folders. Changing the name is possible but not recommended. A window will appear offering to create a desktop icon and a quick launch icon. A desktop icon will place a shortcut to the Dash Logger software on the desktop. A quick launch icon will place a shortcut to the Dash Logger software on the windows quick launch bar (only offered on some operating systems, usually on the lower left side of the screen next to the start menu button). If these are desired, select them and click next. A window will appear summarizing the desired settings. If everything is correct, click install. If these settings need to be changed, click back. Once the installation is complete, a window will appear asking to install drivers now. These are the USB drivers and are required for communication to the D200 Dash Logger. After installation a window will appear asking if you wish to launch the Dash Logger software now, make your choice and click finish.

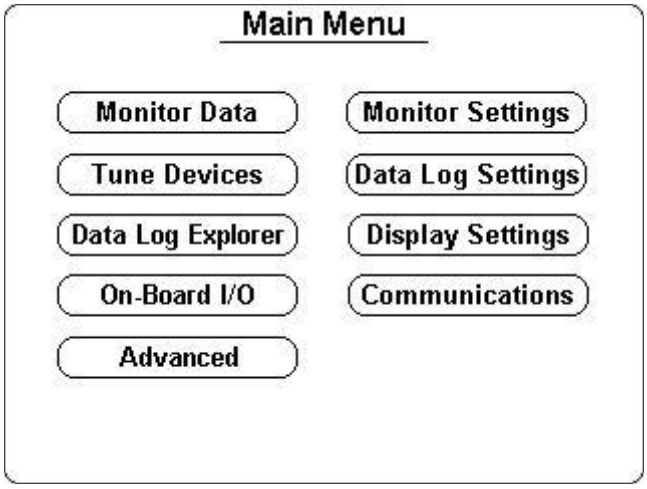
4 Configuring Using the Touchscreen

Many of the D200 Dash Logger settings can be configured from the touchscreen without the use of a computer. This chapter describes each menu and the underlying options and their function. The first section in this chapter is a quick reference guide to setting up a dash for the first time.

NOTE: Analog inputs, Speed inputs, and PWM outputs must be initially configured from the software.

4.1 First Use and Basic Settings Walk Through

This section contains a step by step procedure from powering up the dash for the first time to monitoring and logging data. When the dash turns on, it will display the monitor screen. The first step is to setup display and communication settings. From the monitor screen, select Back. The main menu screen will be displayed as shown below.



The screen should appear crisp and bright. The contrast has temperature based compensation but depending on the viewing angle, the screen may be difficult to read. Select Display Settings. This screen allows configuring of backlight and contrast. Use the arrows to optimize the screen. Once the screen has been adjusted, check the current date and time by selecting Date & Time from the Display Settings Menu.

The dash has a clock to keep the current date and time. It is important to set the date and time because it is used for naming and managing data logs. Adjust the date and time to match the current time. Once the date and time are set, select Save & Back to save the settings. The time and date are not lost when power is disconnected from the dash. To read more about the Display Settings Menu refer to **Section 4.2.7**. Press Back to return to the Main Menu.

Now the dash has to be configured for any devices connected to it. Select Communications from the Main Menu. The three communication inputs, RS-232, CAN A, and CAN B, are shown with buttons. Touch the button of the communications input to setup. For RS-232, select the device connected to the serial port. Once the device is selected, touch the Properties button to see if there are any further settings for that particular device. The button with DATA PC DASH on it is used to switch between normal monitor mode and pass-through mode. Select Back to save the RS-232 settings. If a device is connected on CAN, select the appropriate CAN button and then select the devices on the CAN bus. Select Back to save the CAN settings. More information regarding communication can be found in **Section 4.2.8.**

Once communication settings are configured, the dash will collect the complete data set from each configured source. However, each individual item from a particular source, such as RPM, must be selected to view the data. From the Main Menu, select Monitor Settings then Set Display Data. Select the button for the device from which you wish to view data. Touch the circles for the data you wish to see, and then touch Back. The item labels are shortened to four characters for display.

To monitor the data, select Monitor Data from the Main Menu. Each gauge is assigned an item to monitor. To change the item a gauge monitors, touch the gauge and select the new item. If there are two items with the same name, such as RPM, refer to the bottom of the screen where the source is displayed. If a particular item is not on the available list, but was selected in Set Display Data, then it is not available for that particular gauge. For example, the tach slider can only be assigned to a RPM item.

Units, such as Celsius or Fahrenheit, can be configured from the Monitor Settings button on the Main Menu. Also adjustable from the Units button are tachometer and speedometer ranges for communication devices.

At this point, the dash should be able to monitor all the chosen devices. To configure logging, select Data Log Settings then Sources from the Main Menu. Select either the On-Board Inputs button or the Comm Inputs button. The on-board inputs have individual selectable logging rates, and the communication logging rates are set at the device level. When a logging rate is set for a device everything from the device will be logged at that rate. The rates are adjusted by touching the number next to the item. A value of 10x indicates that device will be logged at 10 times per second (hz). A logging rate of 0x indicates the device will not be logged.

To manually start a data log, select the More button from the monitor screen then select Start Data Log. To stop a data log, either turn the unit off, or select Stop Data Log from the More button on the monitor screen. Starting a data log can also be done by wiring an analog input to a button for more information see Section 6.4.3. The data loges can be played back on the screen or uploaded to a PC for further analysis.

This concludes the quick reference guide to the dash. Further details and information can be found throughout this manual. The next step may be to connect to the dash with a computer to verify software and driver installation, and begin editing the calibration file.

4.2 Menu Structure Navigation

The dash's Main Menu is the top level navigation point for all the menus and screens in the dash. This section describes each button and the levels below them.

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4.2.1 Monitor Data

The Monitor Data button displays the user selected monitor screen. The dash provides four different monitor screens which can be selected from the More button as described below. All monitor screens contain a status bar, a More button, and a Back button. The status bar indicates if the dash is monitoring or logging, and the amount of full data log memory. When the memory is full, this number will read 99%. During a log playback, this number will indicate the percentage of the log that has been played and the current playback mode. The Back button returns to the Main Menu.

4.2.1.1 Monitor Menu

The More button displays the Monitor Menu which contains four buttons.

Show Peak - Hide Peak - Clear Peak

The dash stores the peak values for all inputs. The peak values are lost when the unit is powered down. To view the peak values select Show Peak. The unit will return to the Monitor Screen with the peak values shown. To return to normal monitor mode, select More then Hide Peak. To clear the peak values without resetting the unit, select Clear Peak.

Start Data Log - Stop Data Log

To start a data log from the touchscreen, select Start Data Log. The dash will begin logging and return to the monitor screen. To stop the data log, select More then Stop Data Log.

Select View

The dash provides four different monitor screens to monitor the data. These include:

- Tach Slider and Digital Gauges
- Analog Gauges and List
- Full Screen GPS
- Full Screen Accelerometer

The Tach Slider and Analog Gauge screens allow the user to select a displayed input by touching a particular gauge or display area and selecting the item to be displayed. Some items are limited to certain display types. For example, speed inputs such as RPM or vehicle speed can not be displayed on a 1.1 inch gauge and only RPM can be displayed on the tach slider.

The GPS screen is fixed to all the GPS information from the receiver and does not contain any selectable regions.

The accelerometer screen displays the X, Y, and Z values and a G-G diagram of the X and Y axis. The peak values are also displayed as markers on the X and Y axis and can be reset by selecting Clear Peak from the More button.

4.2.2 Tune Devices

If a PCS Transmission Controller is connected to the CAN A bus, tuning is performed through the Tune Devices button. A display message will appear if a tunable device was not found. The transmission controller must be enabled in the Communications menu and the transmission controller software must be version 2.0 or later.

4.2.3 Data Log Explorer

The dash's Data Log Explorer displays all the data logs on the unit. It can display eight logs per page. The total number of logs, the percentage of memory used, the current page, and the total number of pages is displayed at the bottom of the screen. To increment to the next page select More, to return to the previous page select Back. To erase the entire memory, select Erase. **Note: This will erase ALL the data logs on the dash. To playback a log, select the log then press Play.**

4.2.4 On-Board I/O

The On-Board I/O button from the Main Menu is a very useful screen when testing and debugging a new installation. This screen displays all the raw voltages from each analog input, plus its abbreviation as assigned in the software, and its defined function. It also displays the raw input on the speed channel. If this number is 0, then the speed input is not registering an input. If the number is non-zero, it will not display frequency and it may be more useful to view the data from a Monitor Screen. The two PWM output duty cycles can be viewed as well.

4.2.4.1 PWM Output Override

To test the PWM outputs, select PWM Control. Select either PWM1 or PWM2. When the output is under dash control, its current duty cycle will be displayed in the box in the center of the screen. When the output is under User Control, it will output the duty cycle the user has entered in the box. To enter a duty cycle, touch the box and use the keypad to enter a number.

4.2.5 Advanced

The Advanced Menu provides access to any advanced feature menus, current unlock status of a feature, and access to the feature activation screen. Selecting All Features from the Advanced Features Menu will show the status of all the advanced features. A locked padlock as shown in **Figure 3.2** indicates the feature is not enabled. To activate it, press the Activate button and follow the instructions in **Section 4.2.5.1**. An unlocked padlock as shown in **Figure 3.2** and the word Unlocked next to the feature indicates the feature has been activated.

Figure 3.2

4.2.5.1 Advanced Feature Activation

To activate an advanced feature, a 12-digit activation code is required. This code can be purchased by contacting PCS and supplying your D200's serial number. If the feature was purchased at the time of order an activation code was included with the D200. To activate the feature, go to the Main Menu then select Advanced then All Features. Press the activate button for the feature requiring activation. Enter the12-digit activation code using the keypad and then press Enter. The feature should activate and the locked symbol should change to unlocked. If the activation key was incorrectly entered, select the Activate button again to retry it. After three failed attempts, the D200 will need to be reset to try again. The activation code is keyed specifically to the feature and a serial number in each D200.

4.2.6 Monitor Settings

The Monitor Settings menu is used to select display data and units. Display data is used to select the individual data items from a particular device to display. The Units Menu allows the selection of units as well as tachometer and speedometer settings for communication inputs.

4.2.6.1 Set Display Data

The Set Display Data Menu is used to select the particular items from the sources that you wish to monitor. For example, if a transmission controller is communicating with the dash, you may want to monitor vehicle speed but do not want to monitor accumulator pressure. Therefore, you can enable vehicle speed and disable accumulator pressure. In this example, if you went to the monitor screen you would see (or have the option to see by selecting a gauge to change) vehicle speed from the transmission controller.

The Set Display Data Menu is populated with buttons for every communication device that is enabled. The On-Board Inputs button is always on this screen and includes inputs, outputs, and other dash data such as internal temperature, battery voltage, current gear, and real-time clock time. Select a device to change its displayed data. If the device has more than one page of data, the More button will appear to go to the next page. The Clear Page button clears the data selected for that page. The counter at the bottom of the screen counts all of the inputs selected. The displayed data setting for a device does not change the logging parameters. For example, if a parameter such as RPM is disabled from displayed data, it will still be logged at its devices rate.

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4.2.6.2 Units

The Units Menu allows the user to change the displayed units of temperature, pressure, speed, distance, air/fuel ratio, operating mode, tachometer, and speedometer.

4.2.6.2.1 Operating Mode

The operating mode is either Normal or Demo. The dash should always be in Normal Mode. The Demo Mode is used for displaying the dash at a trade show or in a retail environment where the dash is operating in a display case. In Demo Mode, without any human interaction, the dash will switch back and forth between the monitor screens and play back data to simulate a drag race.

4.2.6.2.2 Tachometer and Speedometer

The tachometer and speedometer settings are used to set the gauge for those variables from a communication device such as an engine control module. On-Board speed input gauges are set from the software when the channel is defined.

4.2.7 Data Log Settings

The Data Log Settings menu is used to select items to data log, and to erase the memory.

4.2.7.1 Sources

The sources screen has a button for selecting rates from On-Board Inputs or Communication Inputs, and a display of the current logging Bandwidth used. As more items are logged, the bandwidth, or number of bytes per second the unit must transmit to the memory increases. The maximum bandwidth of the dash is 26,400 bytes per second. It is possible to select logging rates that exceed the maximum bandwidth. In this case, the percentage at the bottom of the screen will be greater than 100%. This may result in data loss and is strongly discouraged. If the bandwidth exceeds 100% decrease the logging rates of some of the devices.

The rates discussed in this section are for logging purposes only and do not affect the dash data display. If a device or input channel is not setup to log (log rate set to 0x), all of the data will still be available for display in real-time. However, that data will not be visible during log playback on the dash or when viewing the stored data logs.

4.2.7.1.1 On-Board Inputs

The On-Board Inputs data log selection screen includes the data log rates for the eight analog inputs, the two speed inputs, and other pertinent dash data. The other dash data includes PWM outputs, battery voltage, dash internal temperature, and boost control parameters. The On-Board Inputs can be logged at different rates for each channel. For example, Analog Input 1 can log at 100 times per second while Analog Input 2 logs at 10 times per second. This allows fast changing inputs such as boost or shock position to be logged at a fast rate while bandwidth is not lost on slow reacting inputs such as coolant temperature which can be logged at 5 or 10 times per second.

The eight analog inputs appear on the top half of the screen, followed by the 2 speed inputs, and dash data. The number next to each channel is the logging rate. The x next to the number means times per second.

To change the rate at which a device is logged, touch the number, such as 100x, next to the channel. A menu will appear to select the new rate. Select the desired rate and press Done. The desired rate will be stored in the unit when it returns to the Main Menu. A rate of 0x means the device will not be logged.

4.2.7.1.2 Communication Inputs

For a communication device to be logged it must be first selected under the Communications button from the Main Menu. This includes both CAN and RS232 devices. If a device is not selected as an input device, it will not appear on the Communication Input Logging Rates screen. The Communication Inputs rates are set at the device level. Therefore, if a communication device is setup to log at 25 times per second, it will log all the data provided in the data stream from that device at 25 times per second. The logged data will include data not specifically selected under Display Data. To change a logging rate touch the number next to the communication device. A menu will appear with the available logging rates. The maximum logging rate is determined by the communication device. If the device only outputs data 10 times per second, the maximum logging rate will be 10 times per second. Select the desired rate and press Done. The desired rate will be stored in the unit when it returns to the Main Menu. A rate of 0x means the device will not be logged.

4.2.7.1.3 Erase Data Log Memory

The Erase button erases the Data Log memory. It erases ALL the logs in the dash memory. After pressing the Erase button a screen will appear to verify that you wish to erase the memory. If you do not want to erase the memory, select Back. To continue with erasure, press the Erase button in the middle of the screen. The screen will indicate the memory is erasing. Erasing will take about 30 seconds per 2MB of data log memory. Please be patient during this process, the unit is functioning properly. When it is complete, it will display Erase Complete. Touch the screen to continue.

4.2.8 Display Settings

The Display Settings Menu provides access to backlight and contrast settings for day and night mode, date and time settings, and firmware and serial number information. 4.2.8.1 About The About button displays a screen containing the model number, firmware version, and serial number of the dash. Touching anywhere on the screen exits back to the Display Settings screen.

4.2.8.2 Date & Time

The Date & Time button displays the year, month, day, hour, and minute currently stored on the dash. Since the dash uses this information when storing data logs, it is useful to have this time current. The date is displayed in a Year-Month-Day format. Time can be displayed in either AM/PM or 24hr format. To change the format of the time, touch the AM, PM, or 24 label to the right of the current time. To change any information, touch it and select the new value. The Save & Back button will save the current time and return to the Display Settings menu, while the Back button will discard any changes. The time and date will not be lost if the unit is disconnected from power.

4.2.8.3 Day/Night

The dash contains two settings for backlight and contrast to accommodate an installation in a vehicle where lighting conditions may require separate display settings. The Day/Night button switches between the daytime and nighttime backlight and contrast settings. The current mode is displayed on the upper left hand corner. The changes made to contrast and backlight will be associated with whichever mode that is currently displayed. If an analog input is defined to switch between day and night mode, then when the Back button is selected, it will return to the mode commanded by the analog input. If an analog input is not defined as a night mode switch, then the mode selected when the Back button is pressed will remain in affect until either the mode is switched or the unit is reset. Daytime mode is default out of reset.

4.2.9 Communications

The Communications menu establishes any connections to serial or CAN devices. The Communications Menu has three buttons for RS-232, CAN A, and CAN B. Select the button of the communications protocol to setup. Due to the type of network, only one RS-232 device can be setup at a time, whereas multiple CAN devices can communicate at once. 4.2.9.1 RS-232 Pass-Through Mode RS-232 Pass-Through Mode is a feature of the dash that is intended to help in making a clean installation of a serial device. When connecting the dash to a device, such as an after market engine management system, there will be a point when the communication cable between the dash and the ECU needs to connect to a laptop for engine tuning. This would require easy access to the cable resulting in a cable installation that could not be loomed, zipped tied, or otherwise hidden from the common observer. The dash Pass-Through Mode eliminates this problem. The port on the side of the dash should look just like the port the laptop would regularly plug into to communicate with the ECU. Simply plug the serial cable into the dash side port, and touch the pass-through button from the RS-232 Menu. This effectively disconnects the dash from the device and connects the serial device directly to the side port on the dash. The dash will not be able to monitor data from the serial device when in Pass-Through Mode.

Note: The D200 will stay in pass-through mode until pass-through mode has been disabled or the power to the D200 has been turned off.

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5 Configuring/Using the Software

5.1 Overview

The software provides two main functions to the user. Its primary function is for editing the dash calibration file and retrieving data logs. Its secondary function is for firmware upgrading the dash.

The dash calibration file contains all the user adjustable settings such as input devices, input functions, backlight settings, gauge placement, etc. The dash firmware file is the code that runs the dash.

Some settings can be set from the touchscreen and the software, while others can only be changed from the touchscreen or the software. Even though only certain items can be changed from the software, when the software uploads the calibration file from the dash it contains ALL the calibration information. If a calibration file was uploaded from a dash and then downloaded to a different dash, the second dash would appear identical to the first.

5.2 Online vs. Offline Mode

The dash software has two basic modes, online and offline. Online mode is when the dash is connected and communicating using the USB port. Online mode is indicated in the software by a blue background screen and the word Online in the lower left hand corner.

Offline mode is indicated by black background and the word Offline in the lower left hand corner.

If the dash is online, and then goes offline, a screen will appear to indicate the software has lost communication with the dash. It will automatically try to reconnect to the dash every 5 seconds, or when the Retry button is pressed. To stop the Retry click Abort.

To toggle between online and offline mode click the Connect button on the top tool bar.

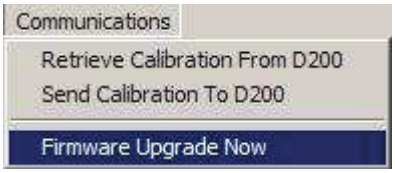
When online, changes can be made to the calibration by clicking Update on the individual forms after changes are made. The changes will be stored in the dash when Update is clicked. The dash should change to a PC Communication Screen when the computer communicates with the dash.

To send a complete calibration file to the dash click the Send Cal button from the top tool bar.

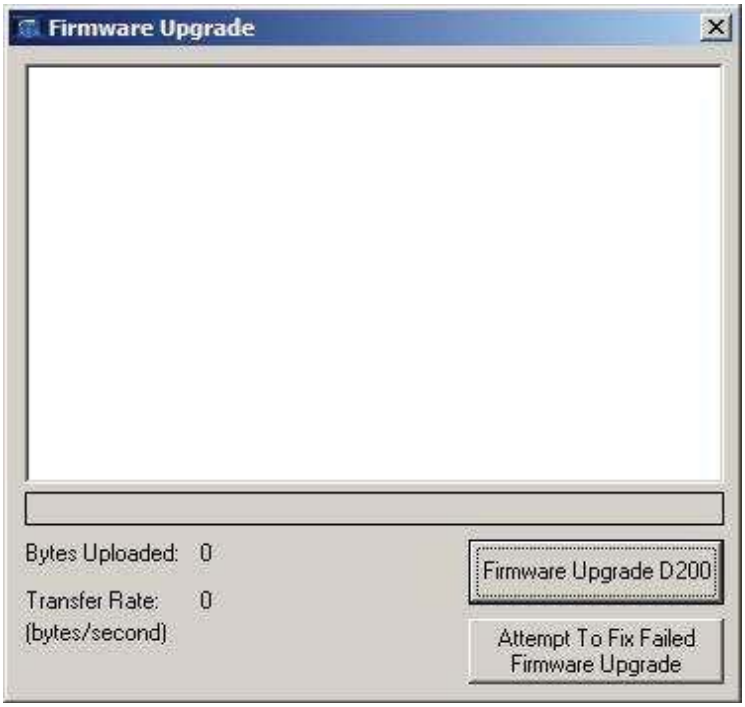
An important note regarding editing calibration files in offline mode is that the Update button must be clicked after each change to save the change to open file even though it is not writing the changes to the dash. Once all the changes have been made, the file can be saved using the Save Calibration function. Later the file can be programmed into the unit using the send cal button.

5.3 Firmware Upgrade

The dash contains field-upgradeable firmware which means that as PCS releases new firmware it is possible to upgrade the dash without sending it back. This procedure is called a Firmware Upgrade and it erases the program on the dash and replaces it with the new firmware. The firmware file has the extension .pbin and is typically named similar to Firmware 1_00_8.pbin. For the latest dash firmware, check the PCS website. Typically a new software install will include a new firmware. The firmware is located in the installed path in a folder named Firmware. To upgrade the dash, select Communications from the title bar at the top of the software. Then select Firmware Upgrade Now.



A window will appear with two buttons on it. Select Firmware Upgrade Dash. A window will appear asking for new firmware file. Locate it, and select Open. The firmware upgrade process will begin.



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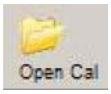
During the upgrade process a progress bar should increment on the software and the dash will say Upgrade Firmware. The dash may go to a very high contrast setting where the screen appears dark and you may not be able to read Upgrade Firmware. This is normal. When the upgrade is complete, the unit will reset and the process will be complete. To verify that the upgrade procedure was a success, from the Main Menu select Display Settings then About. The firmware version number should match the number on the new firmware file.

If the dash loses power during the firmware upgrade process, close the software. Reopen the software. It may not be able to find the dash and give three options such as Start a New File, Open an Existing File, etc. If this window opens, click Cancel. Select Communications from the title bar at the top of the software. Then Firmware Upgrade Now. A window will appear with two buttons on it. Select Attempt to Fix Failed Firmware Upgrade. Locate the firmware file and click open. The firmware upgrade procedure will continue and the dash will reset itself when it is complete. In this case, the screen will be dark during the process and not read Upgrade Firmware.

5.4 Working with Calibrations

The dash calibration files are stored on the PC as .dash files. There are four main functions used when working with calibration files. These are: Open Calibration, Save Calibration, Get Calibration, and Send Calibration.



The Open Calibration function is accessible from the File menu, the Open Cal button on the tool bar, or the keyboard shortcut Ctrl-O. The Open Calibration function is used to open a calibration from the computer to the software for editing. This can be done in online or offline mode.

A base calibration was included in the software installation and can be found in the Calibrations folder of the installation path. If a newer version of the software is installed to the default directory, the new installation will not overwrite saved calibration files, though the older calibration files may have to be converted to work with the new software and firmware. Refer to the installation instructions of the new software for specific details.

The Save Calibration function is accessible from the File menu, the Save Cal button on the tool bar, or the keyboard shortcut Ctrl-S. The Save Calibration function is used to save an open calibration file to the computer.

If the calibration has not been saved before the software will open a box to assign a name and location for the calibration file. If the calibration file has been saved before, the open calibration will replace the existing file. To save the open calibration as a different name, select Save Calibration File As from the file menu.

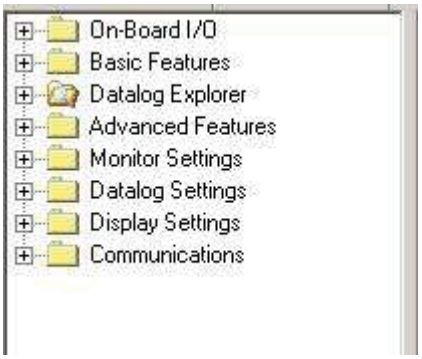
The Get Calibration function is used to retrieve the calibration from a dash and is therefore only used in online mode. To retrieve a calibration from the dash, select Communications then Retrieve Calibration from Dash, or the Get Cal button from the tool bar. The calibration file will download to the computer but it must be saved using Save Calibration for a copy to remain on the computer.

When the software opens, it will attempt to communicate with a dash. If the dash is connected, the software will ask if it should upload the calibration to the computer. Select Yes to retrieve the calibration from the dash and open it for editing. Select No if a previously stored calibration will be opened for editing.

To send a calibration to the dash, select Communications then Send Calibration to dash, or select the Send Cal button from the tool bar. The software will ask if it should send the currently opened calibration or a previously stored calibration. Click Yes to send the opened calibration to the dash. Click No to browse for a calibration file to send.

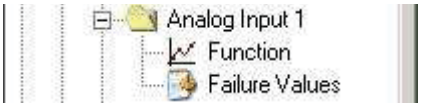
6 Calibration Editing and Software Navigating

6.1 Overview



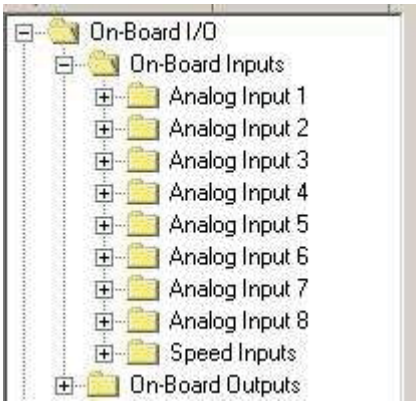
When a calibration is open in the software, a tree-view is shown on the left hand side of the screen. The tree-view contains folders which contain sub items. To expand a folder double-click on it or click the + sign to expand it. The following sections describe each top level folder and the associated sub items.

6.2 On-Board I/O



The On-board I/O Tree-view folder is the top level folder for all devices wired directly to your PCS D200 Dash Logger. From this folder you can select between On-Board Inputs and On-Board Outputs.

6.3 On-Board Inputs



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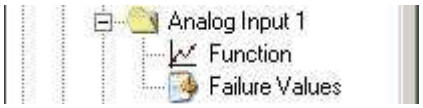
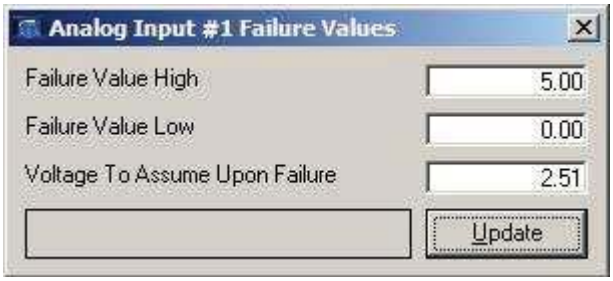
The On-Board Inputs section provides access to the calibration for the eight analog inputs and the two speed inputs. From the tree-view, double-click on the word On-Board Inputs, to show Analog Inputs 1 through 8 and Speed Inputs folders. Double-click on the Analog Input you want to edit.

6.4 Analog Inputs



Each Analog Input contains two forms to edit in the software; Function, and Failure Values.



The failure values for a channel set the maximum and minimum for that channel. These values are 0-5V and are independent from the input function. If the input voltage exceeds the Failure Value High value, it will disregard the high input voltage and use the Voltage to Assume Upon Failure voltage. Likewise, if the input voltage is below Failure Value Low, it will use the Voltage to Assume Upon Failure voltage. The channel will then use the channel function (if defined) to translate the voltage to a converted value (i.e. Boost, or Air Temp).

The function form allows the user to select the function the channel will perform. Setting the function assigns an identity to the channel which includes units, labels, gauge type, and the calibration to relate voltage from the sensor to a human readable value such as Pressure. The available functions for the analog inputs are listed below.

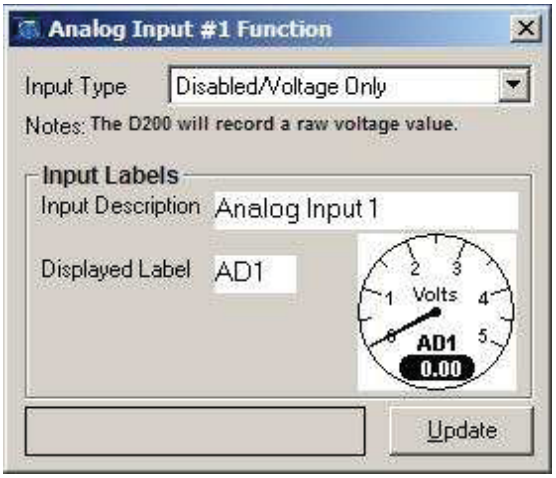
- Voltage
- Percentage
- Data Log Enable
- Lambda
- Night Mode
- Position
- Pressure
- Temperature
- Disable Touchscreen
- Timing Beacon

Each analog input channel can be assigned an input description and a displayed label. The input description is a 20-character name assigned to the channel that will be displayed in the data logs. The displayed label is a 4-character word or acronym that will be displayed throughout the dash to reference that channel.

Analog inputs 1 through 6 do not have programmable pull-up resistors. Analog inputs 7 and 8 do have programmable 1000-ohm pull-up resistors. To enable the resistor open the analog function form for that channel and select the checkbox labeled Enable Pull Up Resistor. The pull up resistor is used for temperature sensors and any 2 wire sensor whose reading is based on resistance. When channels 1 through 6 are disconnected from anything they will read 0V. When channels 7 or 8 are disconnected, they will read approximately 4.38 volts with the pull-up disconnected, and 4.91 volts with the pull-up enabled.

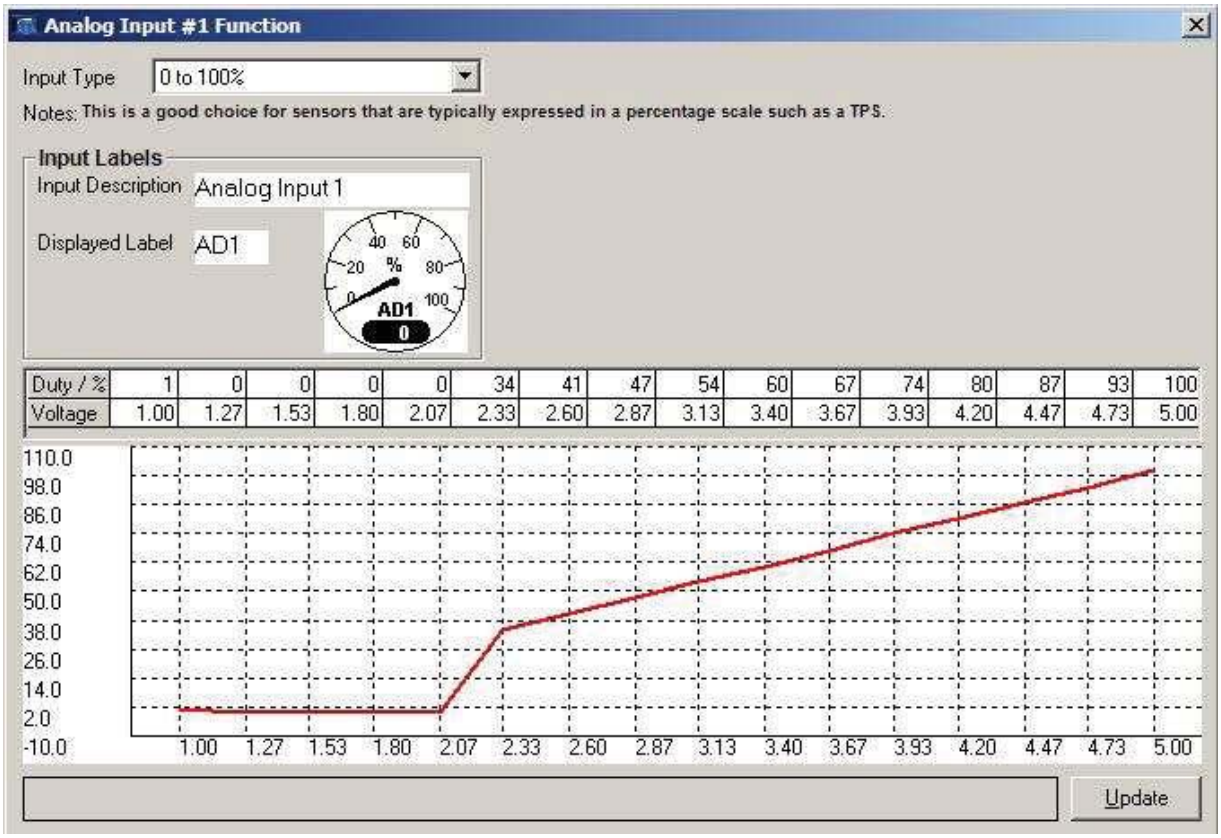
To configure a channel, begin by selecting its function. The form will change as different functions are selected. When each channel is done being edited, the Update must be clicked to send the data to the dash and to save the data locally on the computer.

6.4.1 Disabled/Voltage Only Function



The Voltage Only function displays the input voltage to the channel. If a gauge is selected to monitor this channel it will use the 0-5V gauge and the user's label.

6.4.2 0-100% Function



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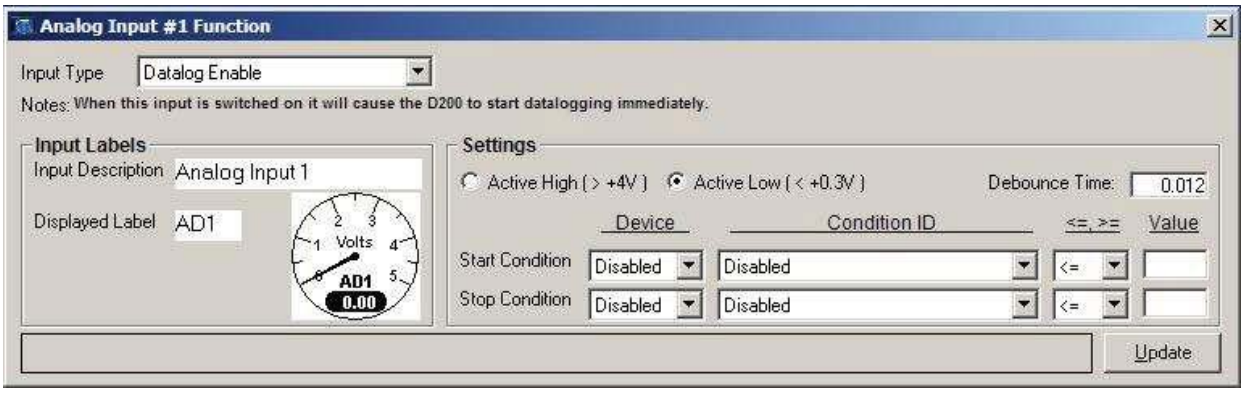
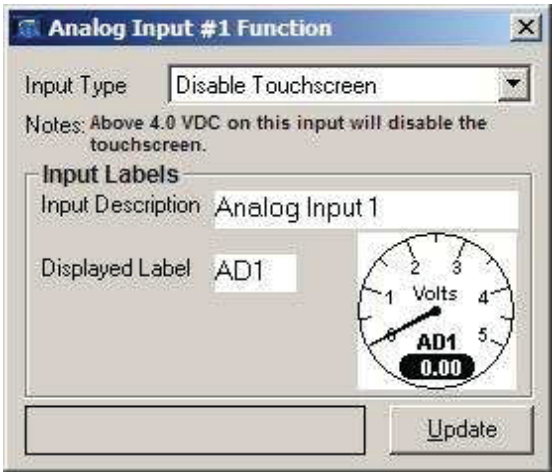
The percentage function allows the user to map a corresponding percentage to the input voltage. This is done using the 16-point table provided on the form. The output will be displayed in a 0-100% format and if a gauge is selected it will use the 0-100% gauge.

6.4.3 Data Log Enable Function



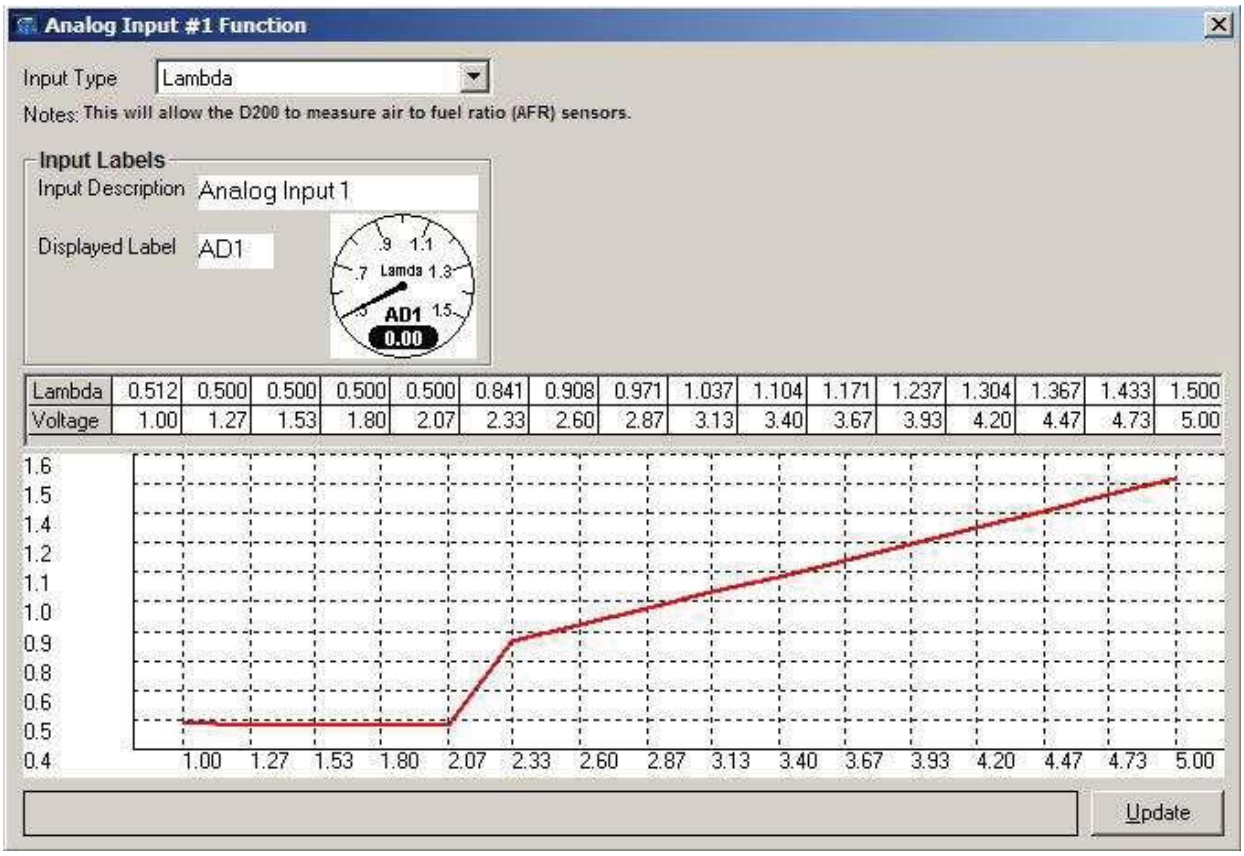
The data log enable allows for remote starting of a data log. This can be wired to a button that is active high (greater than 5V) or an active low button to ground. On the function form, select the option if the switch is active high or active low. Enter a debounce time. The debounce time is a time that the switch must be stable in a particular state (either high or low) before it starts the log. A typical debounce time is 0.2 seconds. The dash can start and stop a log based on information it receives from devices or other on-board channels. To have the dash start logging based on just the switch, set the start and stop condition to disabled. To have the dash start logging based on a particular input, select the input from the drop down list. Enter the condition, either less than or equal to or greater than or equal to, and then the value it needs to test on. When the logging button is pressed and the start condition is true, the unit will start logging. The stop condition can be set up similar to the start condition. When the stop condition is true the log will stop. One option to have logging based on only the start and stop conditions are to use a channel that is typically 0V and have the logging switch based on a low input. This will have the logger always testing on the start condition and start a log when it becomes true. When the stop condition is true, it will stop the log and return to waiting for the start condition to be true. Every time it starts a new log, it will make a new data log file with the date and time.

6.4.4 Disable Touchscreen



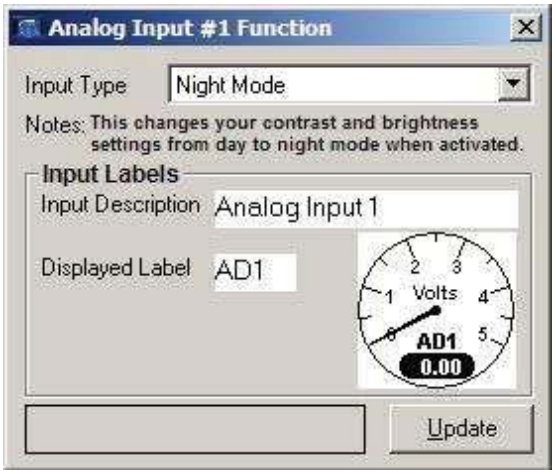
The Disable Touchscreen function prevents the touchscreen from functioning when the assigned input sees 3.85 volts or higher. This function is useful for situations like off-roading where the screen may need to be wiped off regularly due to dust or may be bumped accidentally.

6.4.5 Lambda Function



The Lambda function allows the user to map a lambda or air/fuel ratio value to an input voltage using the 16-point table. It will display the value in either lambda or air/fuel ratio depending on the units settings.

6.4.6 Night Mode Function



The Night Mode function is used to change the contrast and backlight settings from Daytime mode to Nighttime mode. When the input is greater than 4.5V the dash will use the night time contrast and backlight settings. When the input is below 4.5V the dash will use the daytime settings. If the channel is monitored, it will be displayed as voltage and use the 0-5V gauge.

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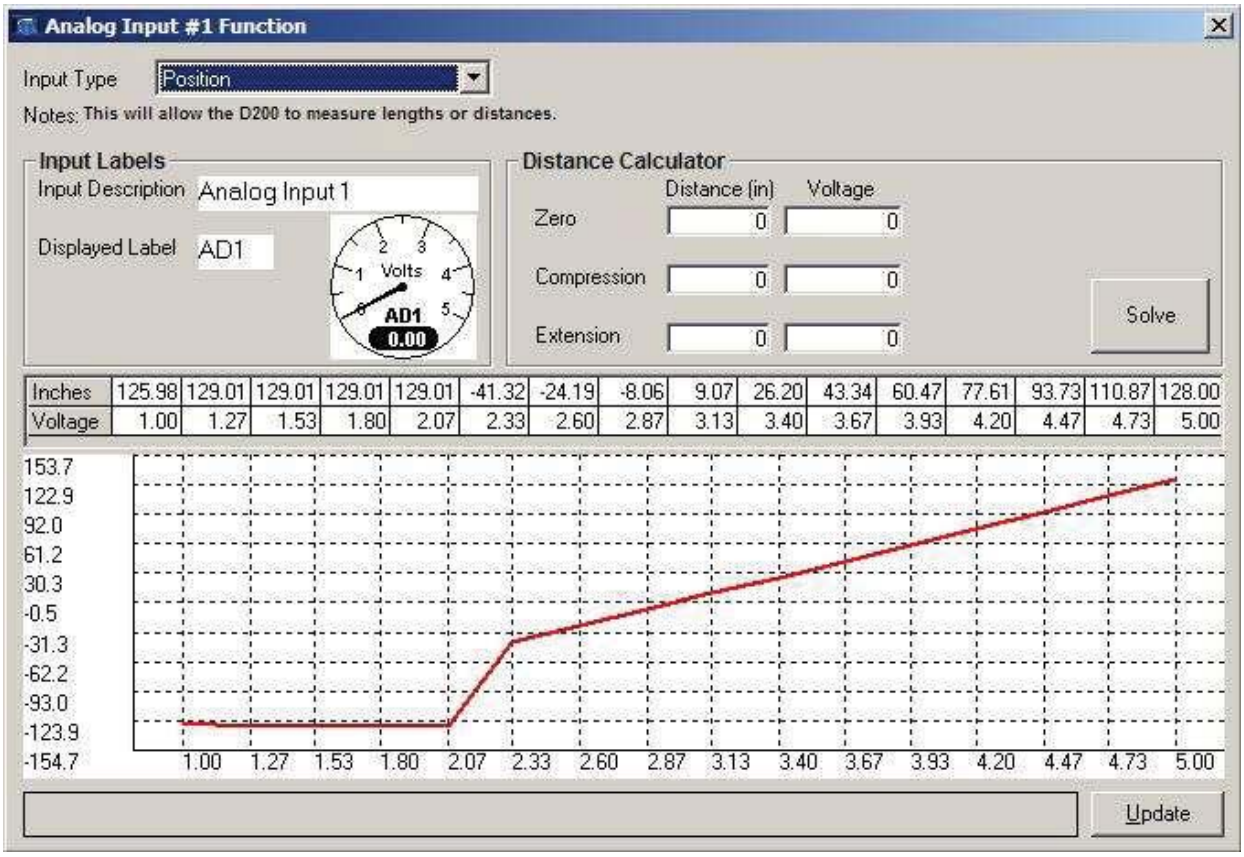
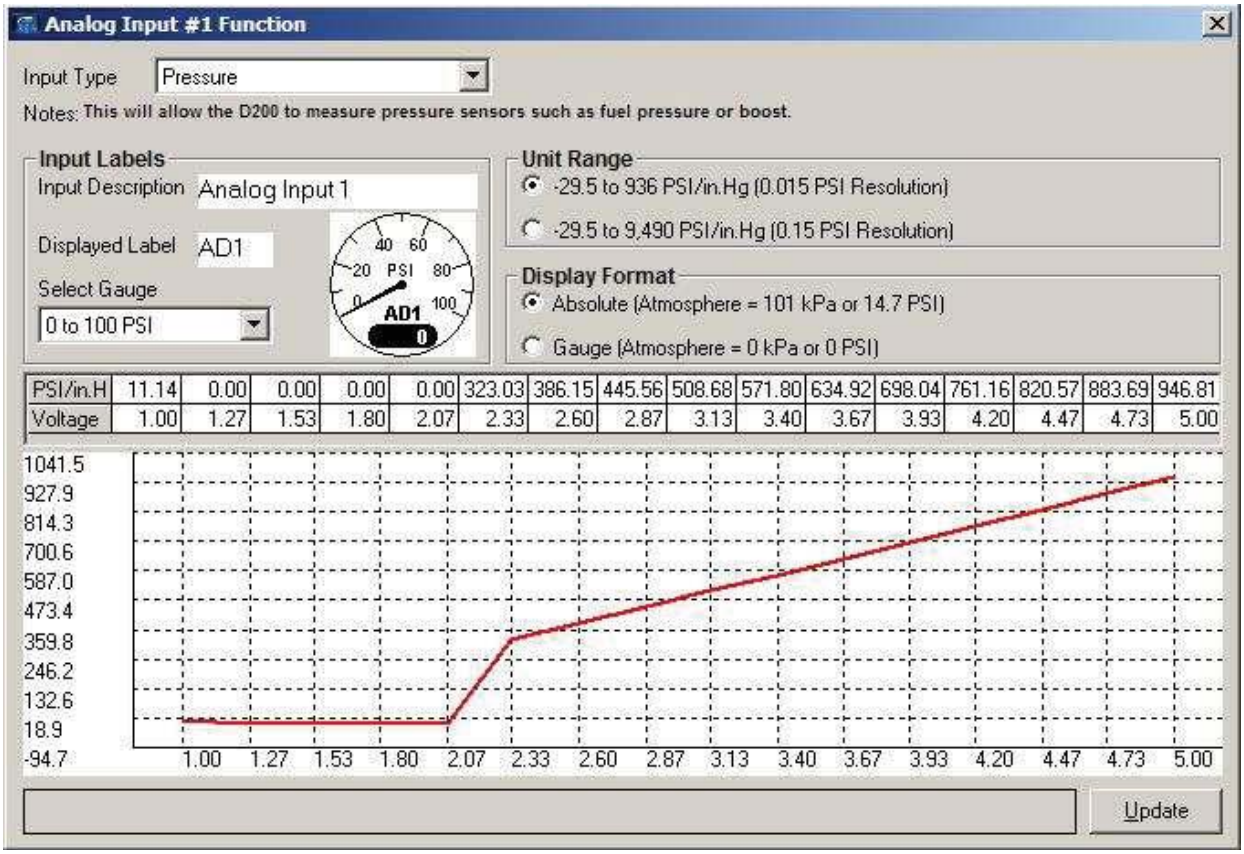
6.4.7 Position Function



The Position function maps position to the input voltage using the 16-point table. Since this channel is typically used for shock position, a shock position solver is included on the form. To use it, power on the dash with the shock position sensors wired and the vehicle on level ground. On the dash, select On-Board I/O from the Main Menu. Enter the voltage displayed for this particular channel in the Zero row voltage. Compress the shock a measurable distance. Record the distance in the Compression row and record the voltage from the dash. Extend the shock a measurable distance, and record the distance and the voltage in the Extension form. Click Solve. The graph and 16-point table will be filled in with calculated values from the entered measurements. The distance will be displayed in inches or millimeters depending on the units settings. If a gauge is selected, it will display the channel using the 0-5V gauge.

6.4.8 Pressure Function



The Pressure function maps pressure to the input voltage using the 16-point table. The pressure can be defined as absolute or gage. If absolute is chosen, the channel should display 0 when it is 101 kPa (14.7 PSI) below atmosphere. If gage is chosen, the channel should display 0 at atmosphere. For pressure values below 6553 kPa (935 PSI) a high resolution measurement (0.1 kPa) resolution is available. For measurement beyond 6553 kPa, chose the standard resolution. Pressure is unique in that the user can select the gauge it would like displayed with the channel. This would depend on the operating range of the channel. Select the gauge by choosing it from the drop down list. It will preview in the window.

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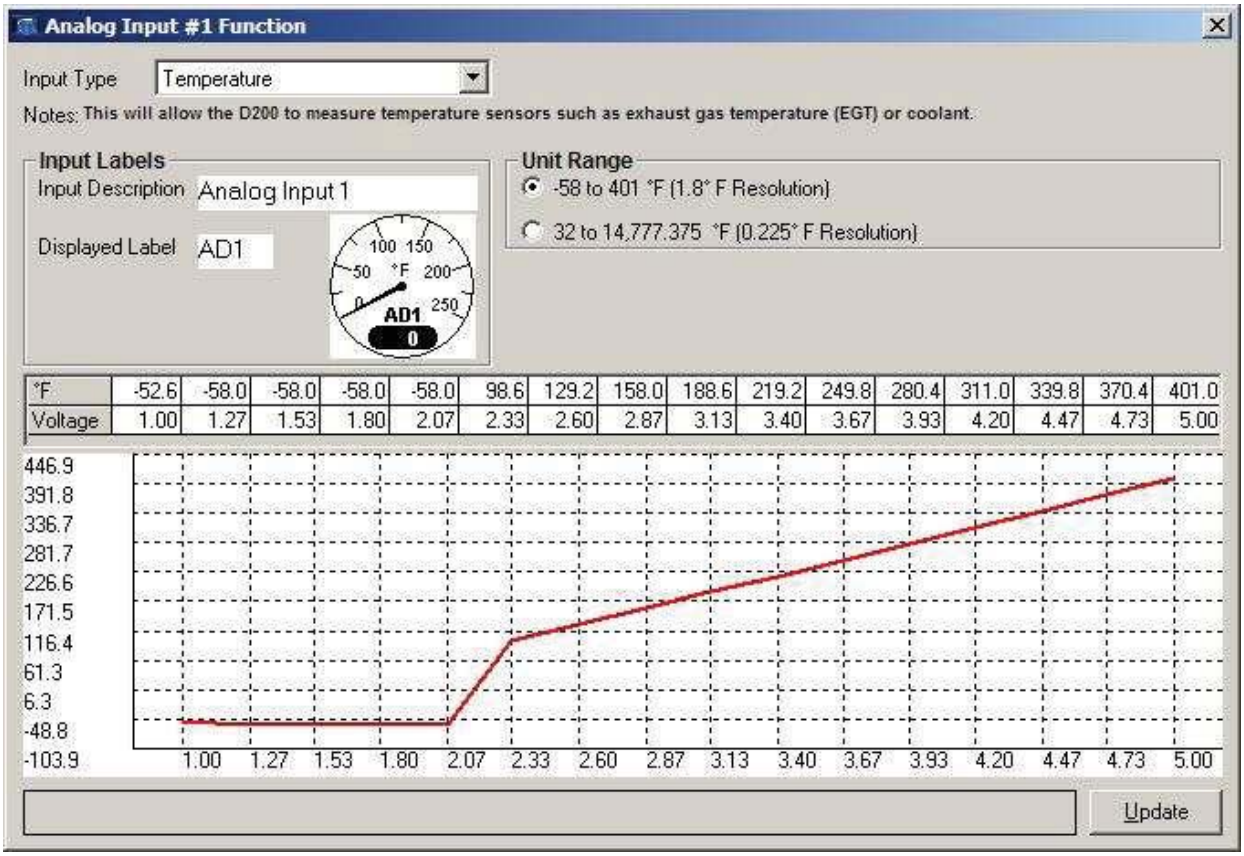
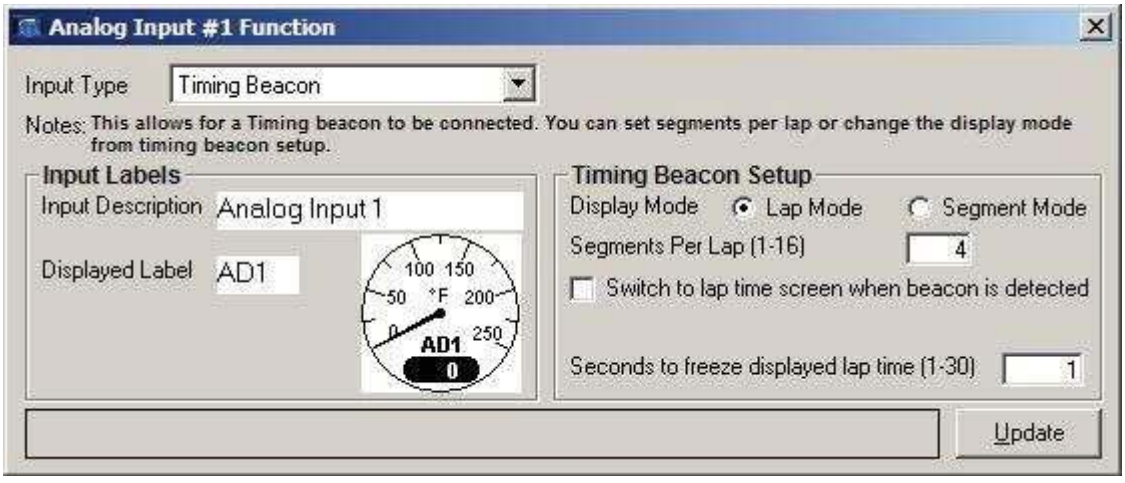
6.4.9 Temperature



The Temperature function maps temperature to the input voltage using the 16-point table. The units are determined by the global dash setting. There are two temperature resolutions available. A standard resolution will measure in 1°C increments up to a maximum of 205°C (401°F). The extended resolution will measure in 0.125°C increments up to a maximum of 8191°C (14,777 °F).

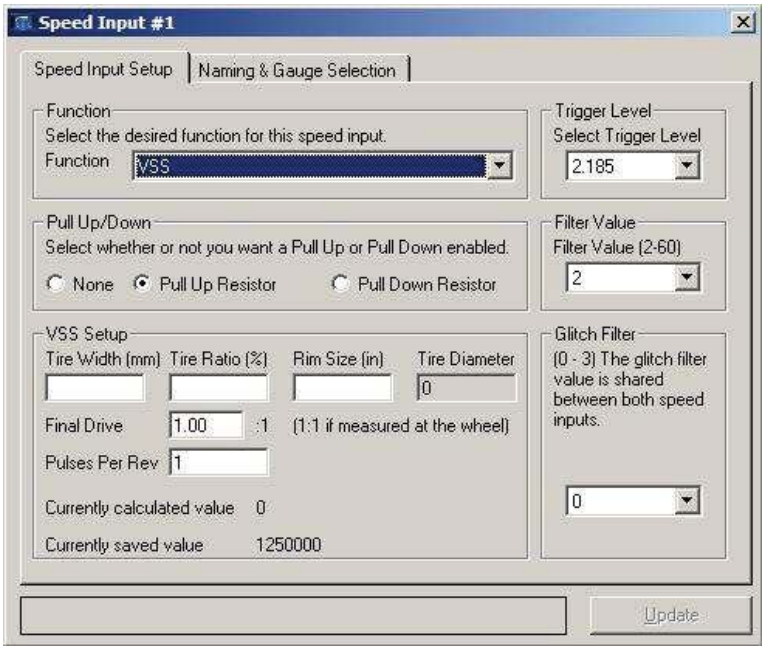
6.4.10 Timing Beacon



The Timing Beacon function allows for a timing beacon to be connected to the assigned input. The Timing beacon has two modes Lap Mode in which each signal received is counted as a lap and Segment mode where the user sets the number of times the signal needs to be received to be considered a lap. The user can also set whether or not the screen switches to the lap screen when the beacon is triggered. The amount of time the lap timer will freeze on the current lap can also be set.

6.5 Speed Inputs

The speed input form contains two tabs; Speed Input Setup, and Naming and Gauge Selection. Function definition and general input setup parameters are on the Speed Input Setup tab while naming are on the second tab.



The trigger level, filter value, glitch filter, and pull up/down resistor are independent of function. The trigger and filter values specify the settings to determine if a signal should be counted or ignored as noise. The trigger level is the voltage above which the signal is considered high. Any voltage below the trigger level is considered low. The trigger level and filter value are specific to each speed input while the glitch filter is shared between both speed input 1 and 2. A 1000-ohm pull-up or pull-down resistor is available for each speed input. The resistor is enabled by selecting the appropriate option on the speed input form.

The Naming and Gauge Selection tab allows the user to assign a 20-character name, a 4-character label, and a gauge to the speed input. The 20-character input description is used in data logs while the 4-character label is used when the channel is displayed on the dash. The user can choose several different gauges, either speed or RPM depending on function, depending on the operating range of the input.

The available functions for the speed inputs are listed below.

- Raw Frequency
- RPM
- Vehicle Speed
- Custom Speed Input

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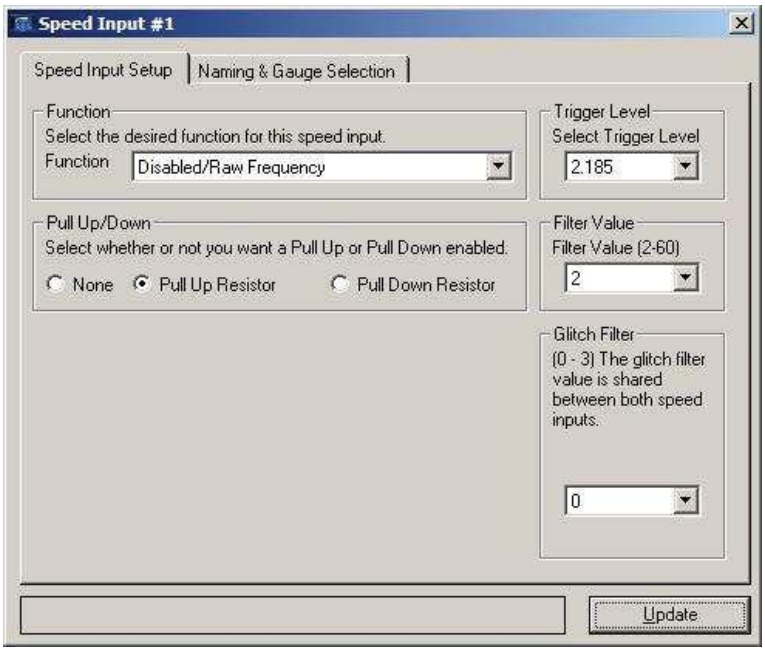
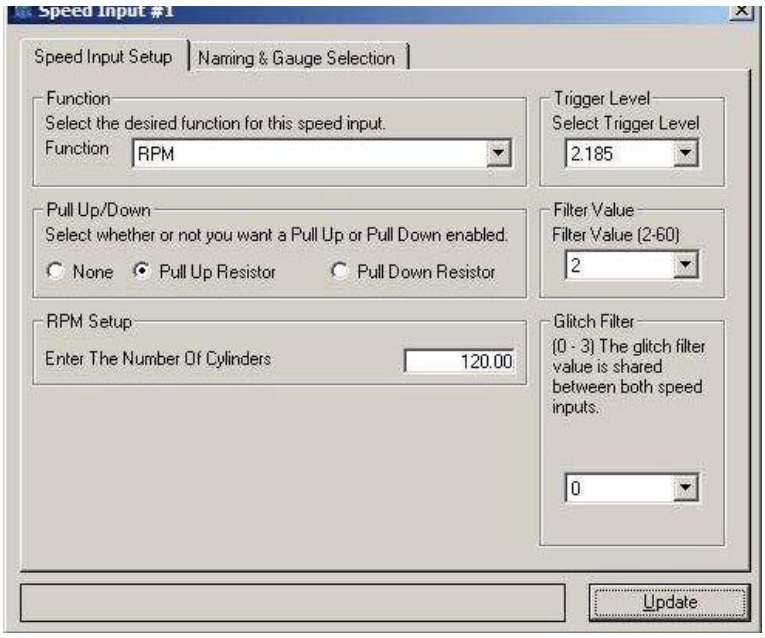
6.5.1 Disabled/Raw Frequency



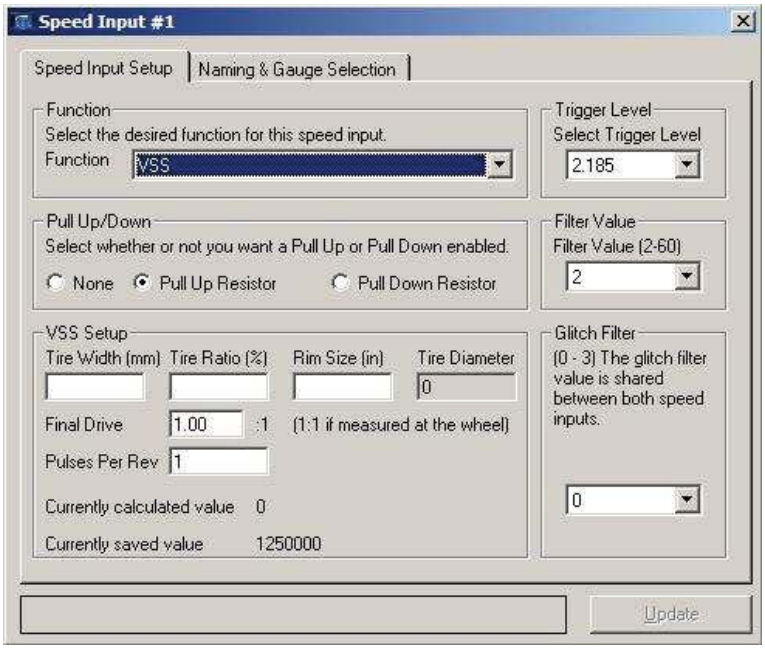
This function will display the input frequency as hertz (Hz) or cycles per second.

6.5.2 RPM



The RPM function uses the input frequency to display revolutions per minute. A tachometer signal from an engine is typically half the number of cylinders per revolution. For example, a 6-cylinder engine tachometer signal will have 3 pulses per engine revolution. If a standard tachometer signal is connected to the dash, enter the number of cylinders of the engine and the dash will calculate the engine RPM accordingly. If the tachometer signal is not a standard tachometer signal the number of cylinders can be a number with a decimal to fine tune the RPM reading. RPM can be displayed as a big gauge with ranges of 4,000, 8,000, 10,000, and 20,000.

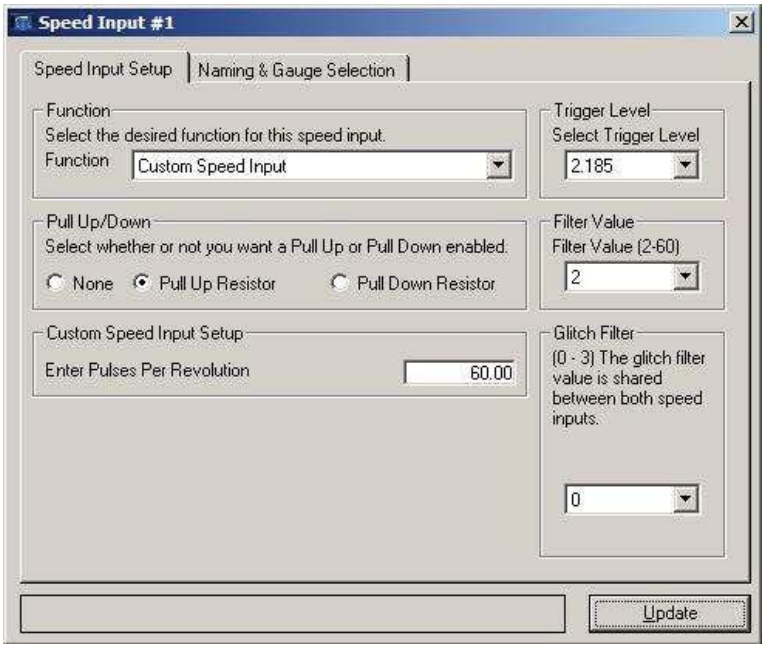
6.5.3 Vehicle Speed (VSS)



Vehicle speed is calculated from either from a driveshaft speed sensor or a sensor on a wheel or axle. Enter the tire size as it is shown on the sidewall of the tire, such as 245/40/16. The software will calculate the tire diameter. Enter the final drive ratio or 1 if the signal is measured after the differential. Finally enter the pulses per one revolution of the wheel or shaft that the sensor is reading. The dash is now ready to convert the input frequency to vehicle speed. Vehicle speed should be compared to a known speed reading from a stock speedometer, a GPS device, RADAR, or measured time over a known distance. If the speed calibration needs to be adjusted the pulses per rev value can contain decimal values to achieve fine tuning.

Vehicle speed units (KPH or MPH) are determined from the global speed setting. Gauge ranges are 160 MPH, 200 MPH, 200 KPH, or 320 KPH.

6.5.4 Custom Speed Input



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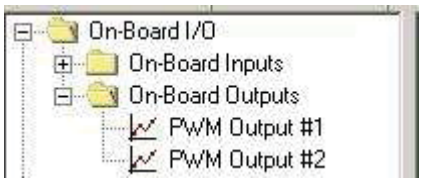
The Custom Speed Input function is similar to the Vehicle Speed Function except the tire size and final drive gear ratio are not needed for the calculation. Instead, enter the pulses per revolution of the sensor. There are no units displayed for this selection.

6.6 On-Board Outputs



The On-Board Outputs are two pulse-width modulated (PWM) high side (+12V) drivers each capable of driving 6 amps continuous. The drivers contain both over-current and over-temperature protection.

6.7 PWM Outputs

The On-Board Output forms are accessed from the tree-view or the menu bar. When opened, the form contains 4 tabs; PWM Setup, Function Setup, Table View, and Graphical View. The PWM Setup tab is used to set the function of the PWM. The functions are listed below.

- Shift Light
- Staged Boost Control
- Screen Override
- Output vs. Generic 16x16 Table
- Alarms
- Shock Control
- 3D Boost Control

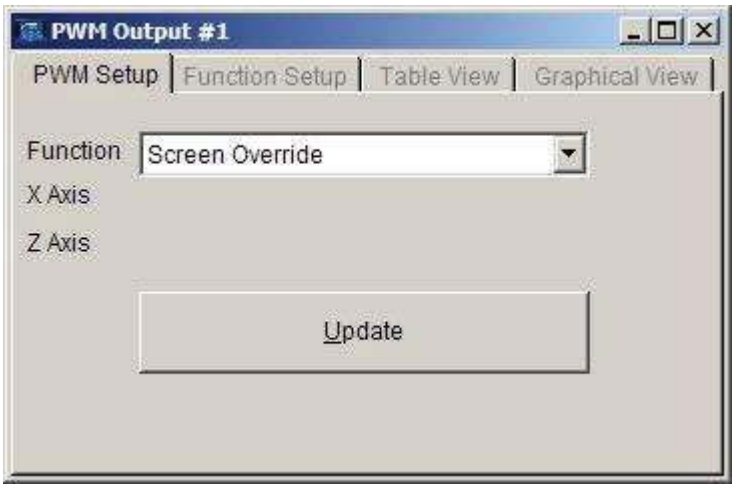
6.7.1 Shift Light

The shift light function allows the dash to turn on a shift light at a particular RPM. To enable the shift light function, select Shift Light from the function drop down menu and click update. The shift light is configured in the Basic Settings section as described in **Section 6.8.3**.

6.7.2 Staged Boost Control

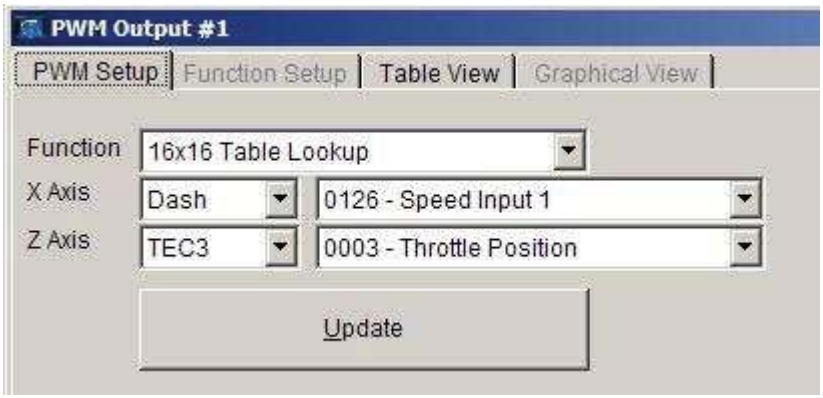
The multi-stage boost control allows the user to set a target boost based on a series of conditions. To enable the function, select it from the drop down menu and click Update. Refer to the multi-stage boost control manual for more documentation.

6.7.3 Screen Override



When a PWM output is set to the Screen Override function, it will allow direct control of the output duty cycle from the touchscreen. The desired duty cycle is set from the touchscreen under the On-Board Inputs, PWM Control button from the D200's Main Menu as described in Section 4.2.4.1. When the dash is turned on, this duty cycle is 0%. If the output channel is not set to screen override, it will clear the user entered value when the Back button is pressed from the PWM Control screen.

6.7.4 Output vs. Generic 16x16 Table



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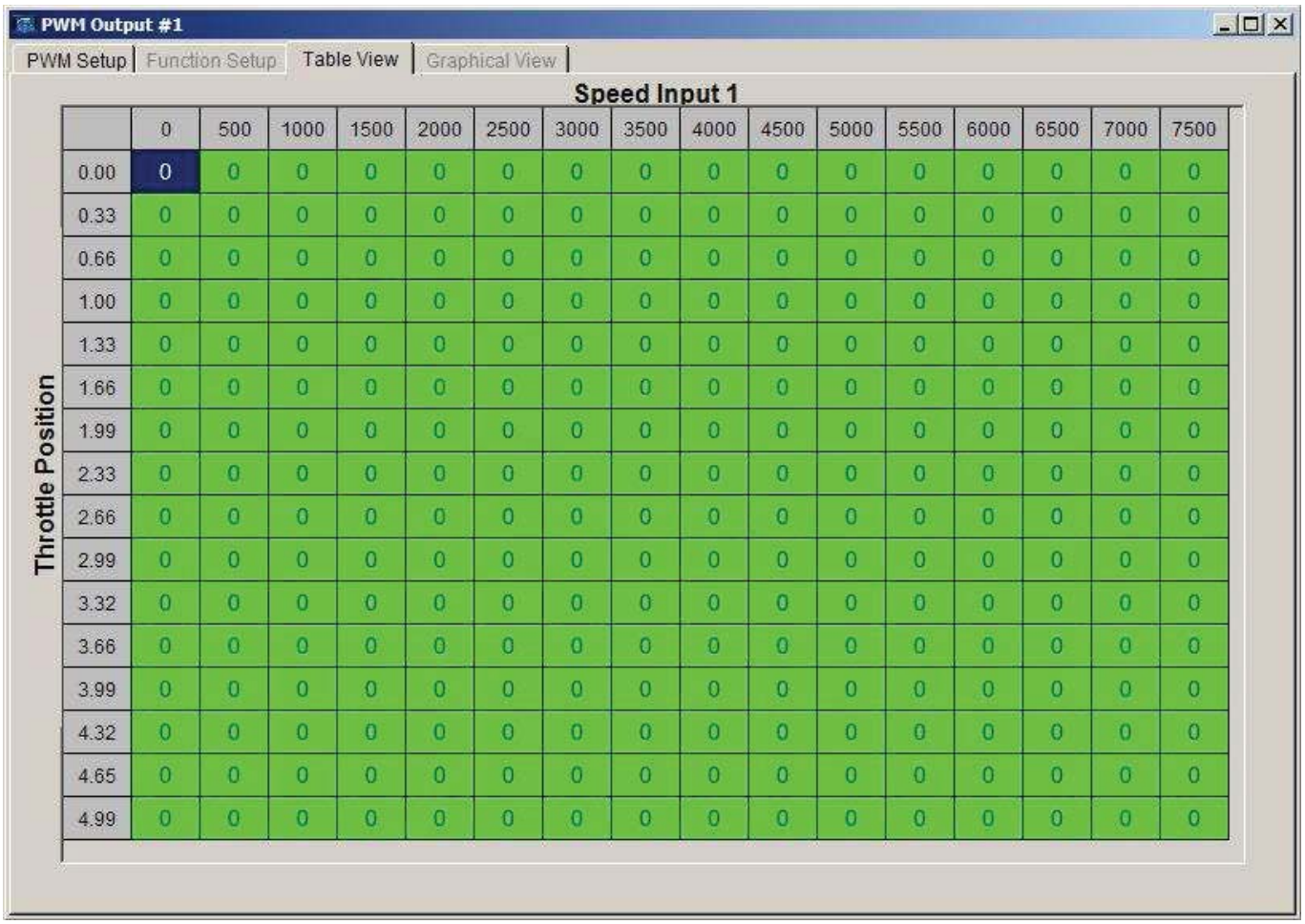
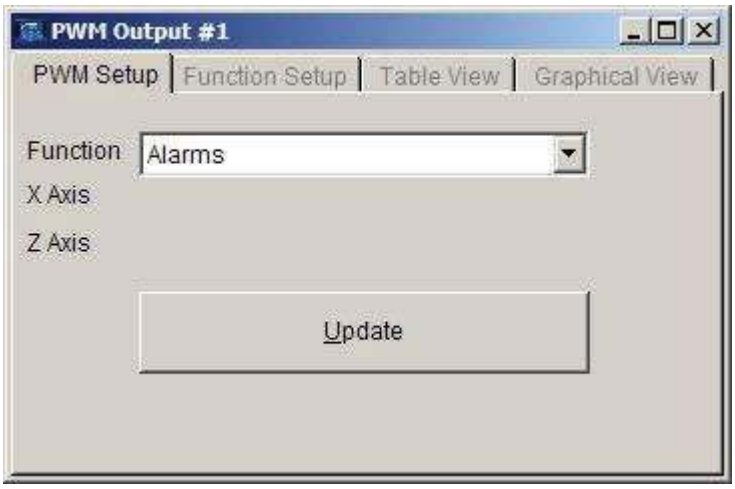


The generic 16x16 table function turns on the output at a specific duty cycle based on two inputs. The inputs can be any input to the dash. Select 16x16 Table Lookup from the function list. Select the variables for the X-axis and the Z-axis and click Update. To edit the breakpoints and the desired duty cycle, select the Table View tab. The X-axis breakpoints are across the top and the Z-axis breakpoints are on the left hand side from top to bottom. The output duty cycle is entered in the table from 0% to 100%.

6.7.5 Alarms



The Alarms function turns on the output when any of the selected alarms are true. Alarms are configured in the Basic Settings section as described in **Section 6.8.1.**

6.7.6 Shock Control

The Shock Control function uses the output to control Koni electric drag racing shocks. Similar to the Koni controller, the D200 has 4 different levels of shock firmness. Unlike the stock controller, the D200 provides 16 different stages to determine the desired shock level. For more information regarding shock control, refer to the Shock Controller Manual.

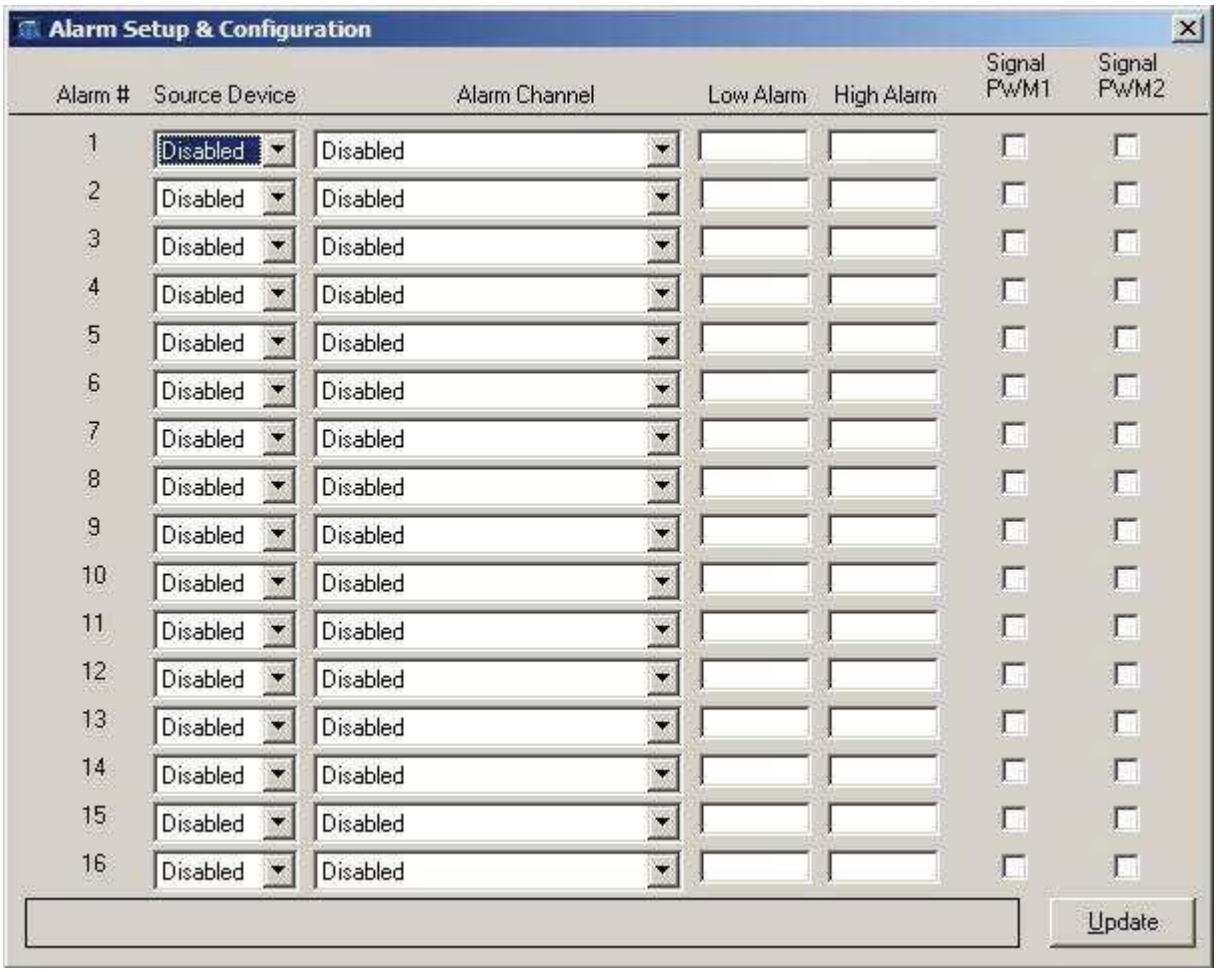
6.7.7 3D Boost Control

The 3D Boost Control function specifies a target boost based on any two inputs to the D200. Select 3D Boost Control from the function list. Select the two parameters to base target boost off of in the X and Z axis. The table view tab is used to enter the target boost. For more information refer to the Boost Control Manual. 6.8 Basic Features

6.8 Basic Features

The Basic Features group includes basic setup information for alarms, logging, gear ratio, and the on-board clock.

6.8.1 Alarm Setup and Configuration



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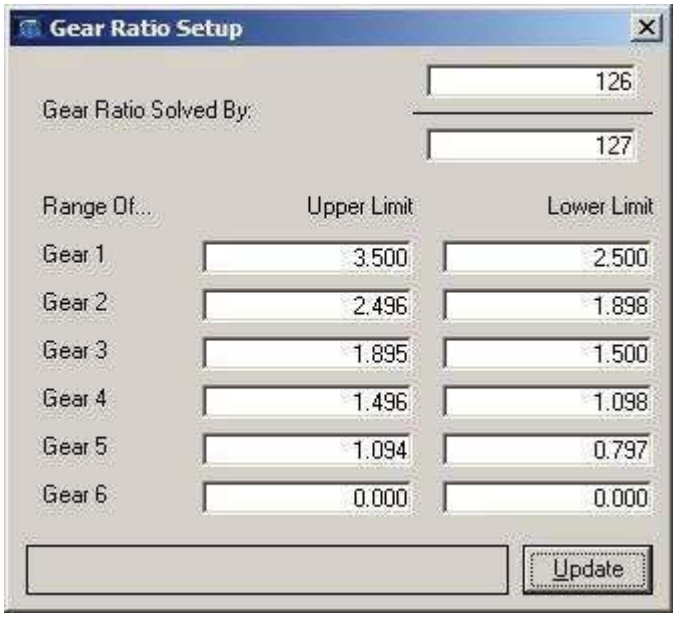
The dash has 16 programmable alarms to monitor input channels and alert the driver if an input is out of range. The alarm setup form is under the Basic Features option in the tree-view or the menu bar. Double click it to open the form. The first column is the source device that will trigger the alarm. The Second column is the channel of the selected device that requires monitoring. The third column or Low Alarm is the value below which the alarm condition exists. For example, this could be used for Oil Pressure less than 20 PSI. If the channel does not have a low alarm value, then enter a very small number or zero, such that the channel can not get into the low alarm state. The next column is the High Alarm value. This is the value above which is considered an alarm state. When the channel value exceeds the value in the High Alarm column, it will trigger the alarm. Similar to the Low Alarm, if the particular channel does not have a High Alarm, enter a very high value that it can never reach.

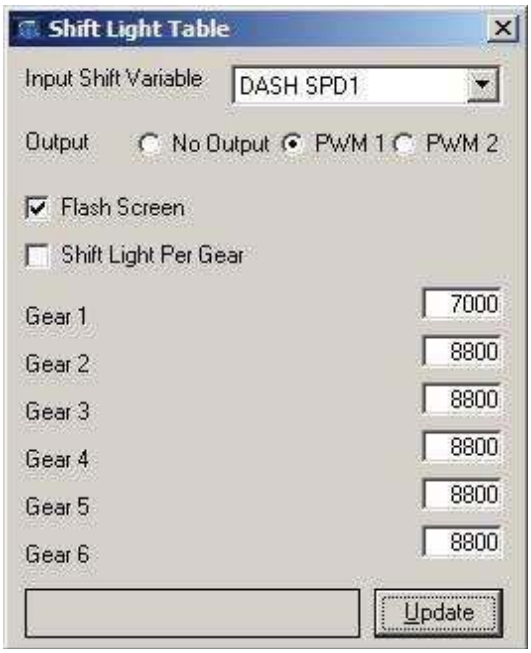
When an input is out of range, there are two ways it can indicate to the driver that there is a problem. The default way is to flash the item on the screen until the input is back within the limits. This will only alert the driver if that particular item is selected for view on that monitor screen. If the item is not viewable then the driver will not be able to see any indication of a problem. However, the alarms also have the capability to be linked to a PWM output channel providing an output such as a warning light when a certain condition exists. Each alarm channel can be linked to either PWM output channel 1 or 2 by selecting the checkbox for that alarm. The PWM must be set up as an Alarm Function as described in **Section 6.7.4.** The output will turn on if any of the linked alarms reach an alarm condition.

6.8.2 Gear Ratio Setup



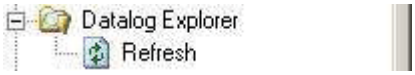
The dash can calculate gear ratio given an input shaft speed and a drive shaft speed measurement. The two speed measurements are typically run to the on-board speed inputs. To determine gear ratio, the dash must divide one speed by the other. The top half of the window allows assignment of the numerator and denominator in the gear ratio calculation. Then enter the gear ratio range for each gear. If the dash detects zero speed, it will return to gear 1. If the dash detects a gear ratio not defined in the calibration, it will remain in the last calculated gear. The dash current gear can be monitored using the CGER label from the On-Board Inputs and is data logged with the dash Data.

6.8.3 Shift Light Table



The shift light function allows the dash to turn on a shift light at a particular RPM. To enable the shift light function, select Shift Light from Treeview under basic features or the drop down menu at the top. Next select the device's RPM input to use for the shift light. The shift light function can be used in either of two ways. The first is to wire a shift light to one of the PWM outputs and select the correct output radio button. When update is pressed if the selected output is not already assigned to the shift light function it will be done for you. A message will display confirming the choice to change the output. The shift light function can also be used by flashing the entire screen when the shift light RPM is exceeded to alert the driver. To have the shift light only flash the screen set the output radio button to no output and put a check in the box next to Flash Screen. Another option is to control the shift light in each gear. For the per gear option to function, the dash must calculate current gear as described in Section 6.8.2. If shift light per gear is enabled, enter the shift points in the boxes provided. If the shift light is not acting per gear, then enter the shift point in the first box. When done entering information click the Update button to send the information to the dash.

6.9 Data Log Explorer



The Data Log Explorer group includes the refresh option. The refresh option checks the D200 Dash Logger for data logs and lists them in the Data Log Explorer window. The Data Log Explorer is the window to view and download logs from the dash. The window is opened automatically when the software opens. If the window is closed, double-click the Data Log Explorer in the tree-view, or click the Logs button on the top tool bar. More information regarding data logs can be found in **Section 7.0.**

6.10 Advanced Features

6.10.1 Boost Control Setup

The Boost Control Setup form is used to set the solenoid operation parameters for the boost control solenoid. For more information refer to the boost control manual for more documentation.

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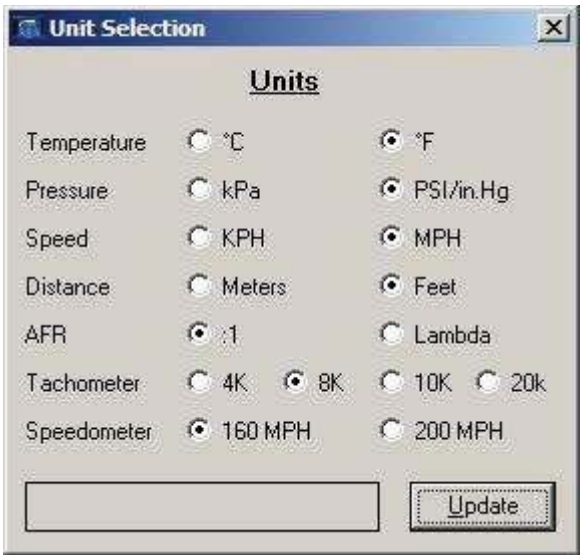
6.11 Monitor Settings

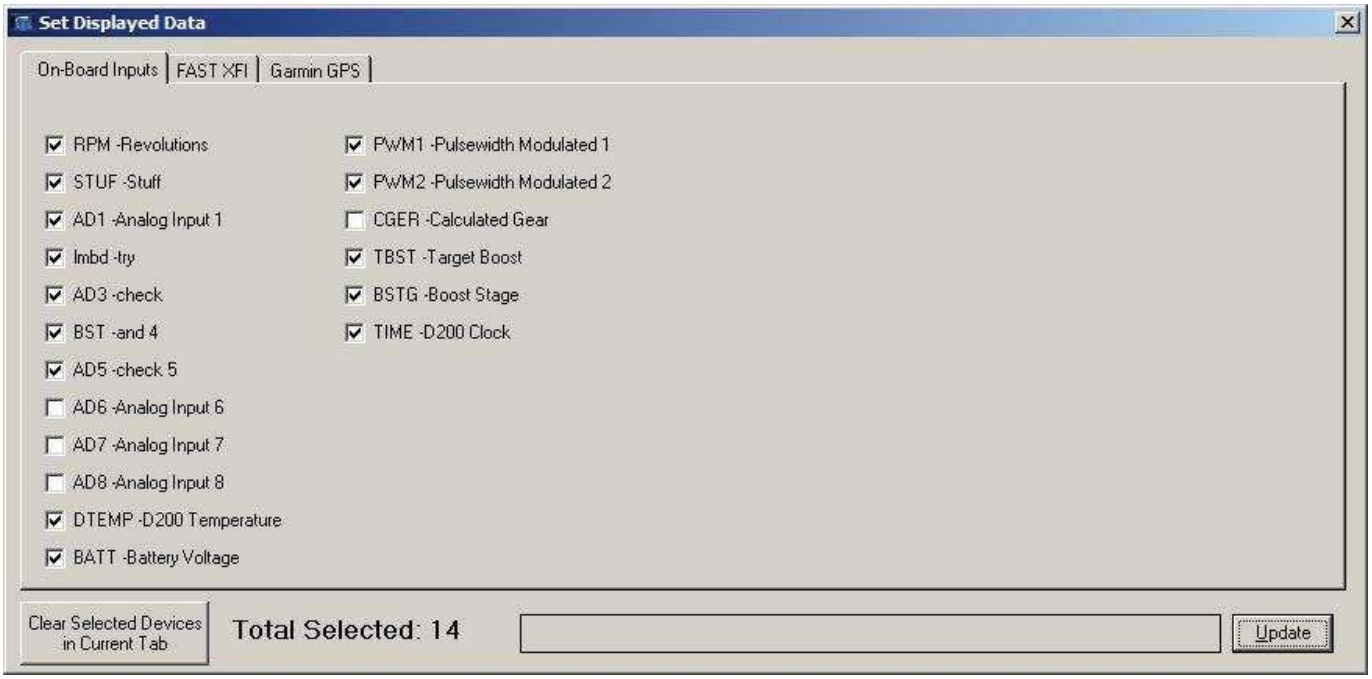
The Monitor Settings group contains the form to edit the desired units for the dash.

6.11.1 Units and Ranges



The Units and Ranges form allows the user to set the units for temperature, pressure, speed, distance, and air/fuel ratio. To open the form select Monitor Settings from the left tree-view and then double click Units and Ranges. Click update to send the new values to the dash.

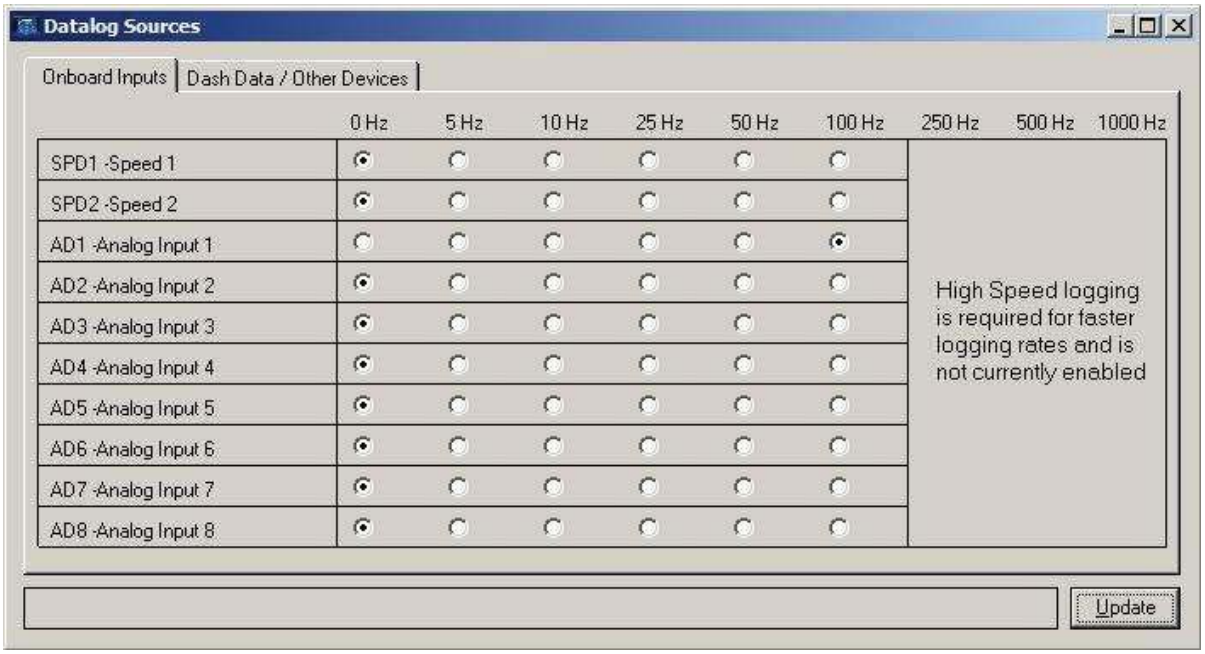
6.11.2 Set Display Data

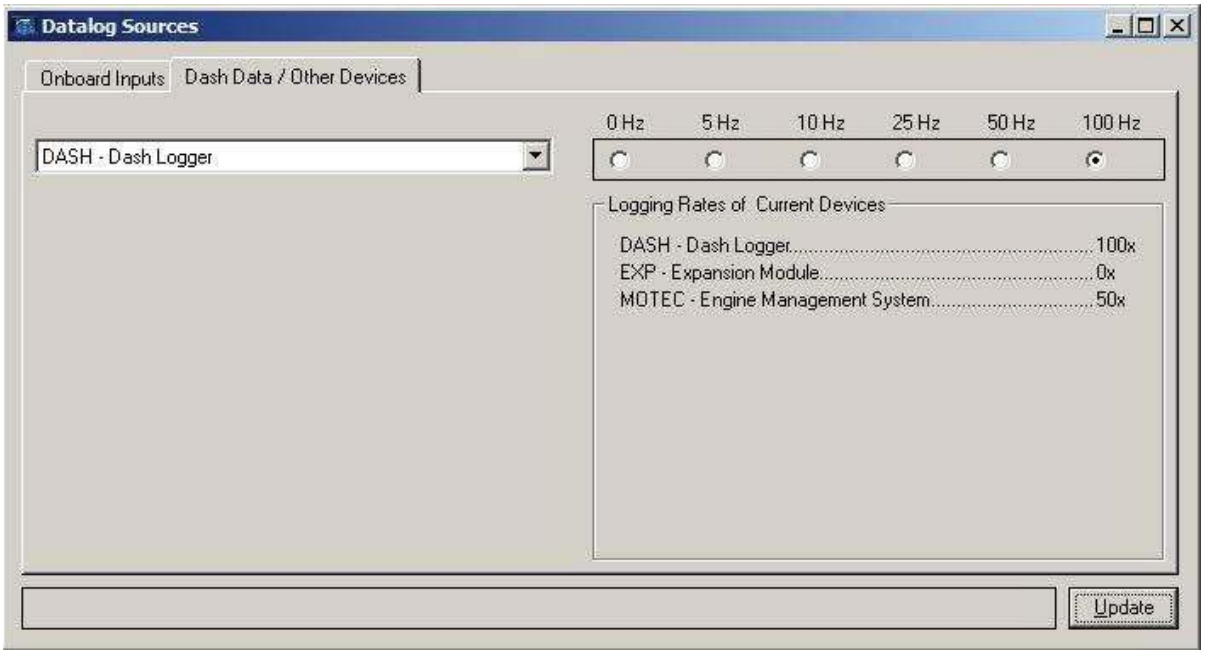


The Set Displayed Data form contains a tab for each devices that has been set in the RS-232 or CAN section of the communications menu as described in **Section 6.13**. Every device tab displays a checkbox for each piece of data that can be displayed on the Dash from that device. Each entry has its abbreviated name that is used within the dash followed by its full name. All selections on the currently displayed tab can be cleared by pressing the button on the bottom left of the form. When finished making selections press the update button in order to program them to the dash.

6.12 Datalog Settings

6.12.1 Datalog Sources





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The Datalog Sources form consists of two tabs Onboard Inputs and Dash Data / Other Devices. The Onboard Inputs tab logging rates for each input connected directly to the dash are selectable. Dash Data / Other devices contains the selections for all devices connected through CAN or RS-232. To set the logging rates select either onboard inputs or communication inputs and choose the desired rate for the device a press the update button. The columns are listed with headings of Hz (Hertz) or times per second where a selection of 10Hz indicates a logging rate of 10 times per second. A rate of 0 Hz indicates that channel will not be logged.

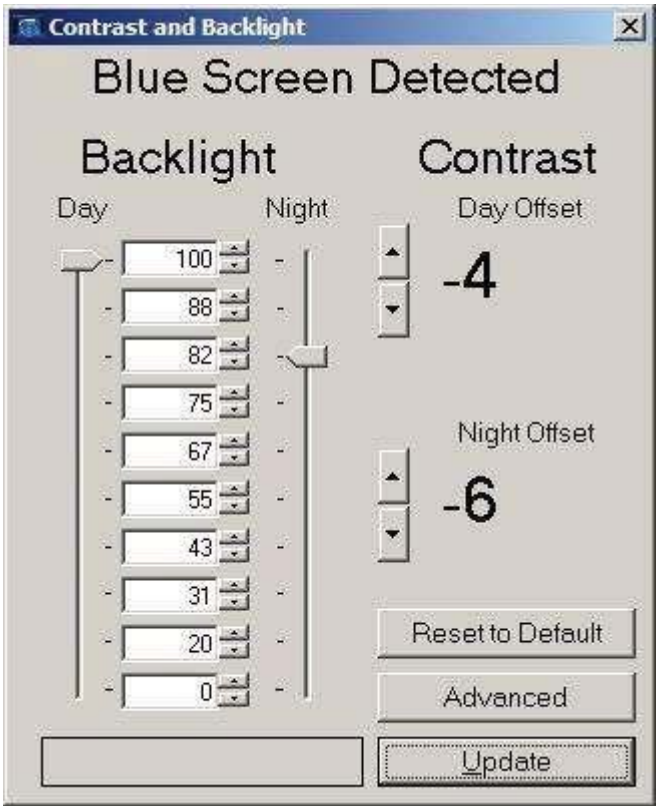
6.12.1 Erase All (Data Logs)

This erases all data logs currently stored on the Dash Logger. A message box will appear to confirm that all data logs are about to be erased from the unit.

6.13 Display Settings

The Display Settings group contains the forms to control and adjust the dash contrast and backlight.

6.13.1 Contrast and Backlight



Contrast and Backlight are typically adjusted from the touchscreen in the Display Settings Menu. The software provides slightly more control of the settings and the ability to recover a dash if incorrect contrast and backlight settings result in not being able to see the screen. It is recommended to always adjust the contrast and backlight settings from the touchscreen. To open the Contrast and Backlight form in the software, select Display Settings on the left tree-view, then double click Contrast and Backlight.

When the form opens, it should indicate whether a black screen or a blue screen was detected. If the software does not match the actual screen type, the dash will work, but PCS technical support should be contacted.

The left side of the form is for backlight settings. There are 10 different backlight levels. When an up or down arrow is selected on the dash, it is changing to one of the 10 levels. Each level is a duty cycle value between 0-100%. To change the current level (same as touching an up or down arrow on the dash), move the slider for either the daytime or nighttime mode. To change the duty cycle at each level, edit the number in the box.

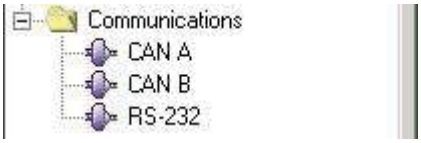
The right hand side of the form adjusts contrast settings. The contrast is based on a temperature referenced 16-point table. Differences in contrast exist from one dash to another based on the manufacturing of the LCD. To compensate for this, the entire table can be offset accordingly. This offset number can be increased or decreased using the arrow keys. The temperature table can be viewed by clicking the Advanced button.

Once changes are complete, click the update button. If the screen backlight or contrast becomes set such that the screen can not be seen, select the Reset to Default button and then click Update. The screen should be visible once the update is complete.

6.13.2 Set Date and Time

The dash's on-board clock can be synchronized to the computer's clock. Open the set clock window and wait for the computer's time to appear. Then click Set Clock Now. The dash time should match the computer's time.

6.14 Communications



The Communications window is similar to configuring the communications using the dash's touchscreen. Choose the communication protocol to set up and then select the input devices. RS-232 can only have one device, while CAN may have more than one.

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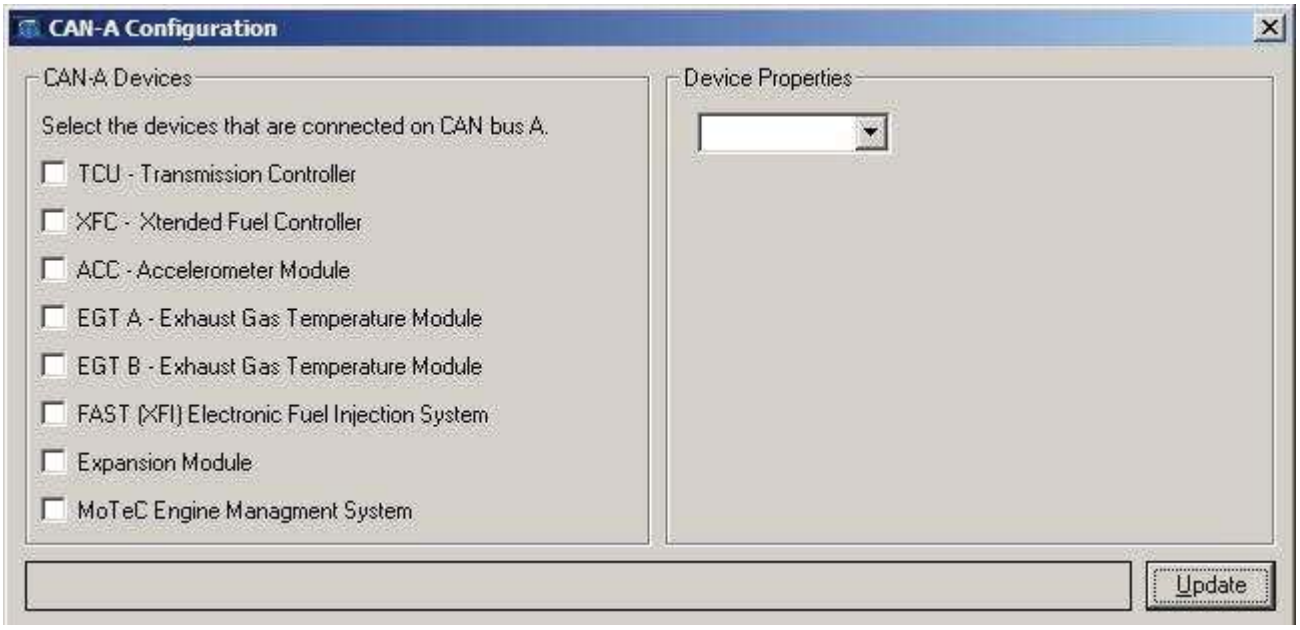
6.14.1 CAN A

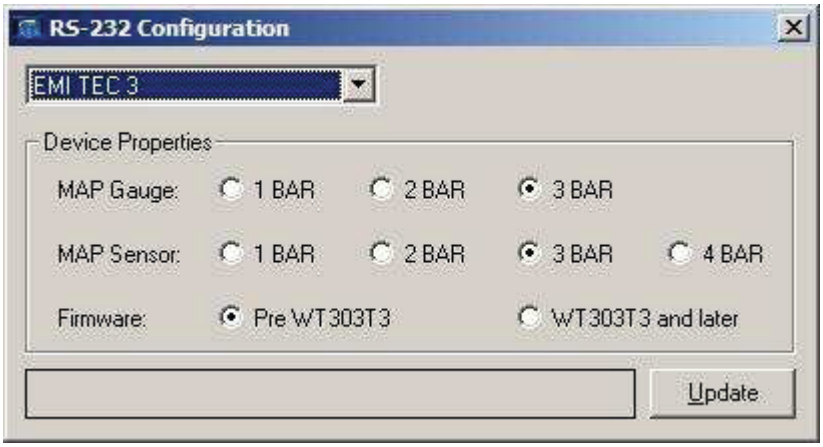


The CAN A configuration form displays all devices that can be connected through the CAN interface. More than one device can be received over can as long as they transmit at the same speed. The software and touchscreen interfaces will not allow devices with different speeds to be selected on the same CAN interface. After selecting a device its name will appear in the drop down menu to the right. If the device has any configurable properties select it in the drop down to view the device properties. When done the update button must be pressed to write the information to the dash logger.

6.14.2 Can B

The CAN B form has the same layout and operations as CAN A

6.14.3 RS-232



Only one device can be selected to communicate over RS-232. After the device is selected if there are any configurable properties they will appear under the drop down menu. When properties have been configured click update to set the communication device in the controller.

7.0 Data Logging

A data log can be initiated by either touching the screen or by an analog input.

7.1 Start a Log from the Touchscreen

To start a log from the touchscreen, from the Monitor Screen select More then Start Data Log. Logging will begin.

7.2 Start a Log from an Analog Input

To start a log from an analog input, configure the input as described in **Section 6.4.3**. When the condition to begin logging is true, the dash will begin logging.

7.3 Stop a Data Log

A data log can be stopped one of three ways. The first way is to turn off the dash. The dash will contain all the data up to the last second it had power. This is typically used in drag racing applications where the driver turns off power to the car at the end of the quarter mile. The second way to stop logging is to manually select Stop Data Log from the More button from a Monitor Screen. The third way, which will only work if an analog input is defined as a data log switch, is to define a trigger set point (such as engine RPM less than 1500) which stops logging when true.

7.4 Data Log Play Back on the Dash

To play back a data log, select Data Log Explorer from the Main Menu. A list of all the logs on the unit will appear. Up to 128 logs can be stored on the dash and only 8 are listed at one time. To view more logs, select More and to move a page back select Back. Touch the log desired for play back and then touch play. The monitor screen will be drawn and the log will be paused. To play the log touch Play. The Monitor Screen status indicator will show how much of the log has been played (0-100%). To view the log twice as fast, touch the fast forward button. To pause the log playback, touch pause. To reset the log to the beginning touch the reset button. To stop playback mode, touch the stop button.

7.5 Data Log Download to the PC

The data logs are downloaded from the dash to the PC using the dash software. The software must have the calibration open when the data logs are uploaded. Therefore, if the software opens and detects a dash, select Yes when it asks to upload the calibration. If the unit is online but the software does not have an open calibration, then select the Get Cal button from the top icon bar. If the calibration is not open and a log is downloaded, a warning message will appear asking if it should proceed with the data log download. Click No, and then download the calibration by clicking the Get Cal button from the top icon bar.

The dash logs are shown in a small explorer window named Log File Explorer that opened when the software opened. If the Log File Explorer is not open in the software, select Logs from the top icon bar. To have the software search for logs, select Refresh in the Log File Explorer window. If logs are on the unit, a list will be generated. Click the log you wish to download and then click the Download button. The logs are saved as .dlg files to the computer. They are saved to the installed directory in a folder named Datalogs. To view this folder click View Downloaded Logs, or navigate there using Windows Explorer. Double click the log name in the Datalogs folders to view the log using the Data Log Viewer. Double clicking the log in the Log File Explorer will automatically download the log and open the file in the Data Log Viewer.

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This section contains specific information for viewing and logging from devices listed below.

- AEM
- Autronic SMC,SM2
- Autronic SM4
- D200 On-Board Inputs
- Electromotive TEC2
- Electromotive TEC3
- Electromotive TEC GT
- FAST Classic Engine Controller
- FAST XFI Engine Controller
- Garmin 5Hz WAAS Enabled GPS
- Innovate Wideband
- Microtech
- Motec ECU
- PCS Transmission Controller
- PCS Xtended Fuel Controller (XFC)
- PCS Accelerometer Module
- PCS Exhaust Gas Temperature (EGT) Module
- Sakura FC-10

Parameter	Data Log Title	Label	Big Gauge	Small Gauge	Tach Slider	List	Blocks	Logged
Analog Input 08	ADCR08	AD08	No	Yes	No	Yes	Yes	Yes
Analog Input 11	ADCR11	AD11	No	Yes	No	Yes	Yes	Yes
Analog Input 13	ADCR13	AD13	No	Yes	No	Yes	Yes	Yes
Analog Input 14	ADCR14	AD14	No	Yes	No	Yes	Yes	Yes
Analog Input 15	ADCR17	AD17	No	Yes	No	Yes	Yes	Yes
Analog Input 16	ADCR18	AD18	No	Yes	No	Yes	Yes	Yes
Analog Input 17	ADCR15	AD15	No	Yes	No	Yes	Yes	Yes
Analog Input 18	ADCR16	AD16	No	Yes	No	Yes	Yes	Yes
Coolant Temperature	Coolant Temp	CLT	No	Yes	No	Yes	Yes	Yes
Engine RPM	RPM	RPM	Yes	No	Yes	Yes	Yes	Yes
Error Codes 1	Error 1	NA	No	No	No	No	No	Yes
Error Codes 2	Error 2	NA	No	No	No	No	No	Yes
Gear	Gear	GEAR	No	Yes	No	Yes	Yes	Yes
Load Input	Load	LOAD	No	Yes	No	Yes	Yes	Yes
Manifold Air Temperature	Air Temp	MAT	No	Yes	No	Yes	Yes	Yes
Oxygen Sensor 1	O2 1	O2 1	No	Yes	No	Yes	Yes	Yes
Oxygen Sensor 2	O2 2	O2 2	No	Yes	No	Yes	Yes	Yes
Throttle Position	TPS	TPS	No	Yes	No	Yes	Yes	Yes
Vehicle Speed	VSS	VSS	Yes	No	No	Yes	Yes	Yes

Table 1: AEM Data Properties

Parameter	Data Log Title	Label	Big Gauge	Small Gauge	Tach Slider	List	Blocks	Logged
Air Fuel Ratio	AFR	AFR	No	Yes	No	Yes	Yes	Yes
Battery Voltage	Battery Voltage	BATT	No	Yes	No	Yes	Yes	Yes
Charge Temperature	Charge Temp	CTMP	No	Yes	No	Yes	Yes	Yes
Coolant Temperature	Coolant Temp	CLT	No	Yes	No	Yes	Yes	Yes
Driven Wheel Speed	Driven Wheel Speed	DWSP	No	Yes	No	Yes	Yes	Yes
Engine RPM	RPM	RPM	Yes	No	No	Yes	Yes	Yes
Exhaust Back Pressure	Back Pressure	EXBP	No	Yes	No	Yes	Yes	Yes
Ignition Advance	Advance	ADV	No	Yes	No	Yes	Yes	Yes
Injector Duration	Injector Duration	IDUR	No	Yes	No	Yes	Yes	Yes
Intake Air Temperature	IAT	ITMP	No	No	No	Yes	Yes	Yes
Manifold Pressure	MAP	MAP	No	Yes	No	Yes	Yes	Yes
NTC1	NTC1	NTC1	No	Yes	No	Yes	Yes	Yes
NTC2	NTC2	NTC2	No	Yes	No	Yes	Yes	Yes
NTC3	NTC3	NTC3	No	Yes	No	Yes	Yes	Yes
NTC4	NTC4	NTC4	No	Yes	No	Yes	Yes	Yes
Throttle Position	TPS	TPS	No	Yes	No	Yes	Yes	Yes
Vehicle Speed	VSS	VSS	Yes	No	Yes	Yes	Yes	Yes

Table 2: Autronic SMC/2 Data Properties

Parameter	Data Log Title	Label	Big Gauge	Small Gauge	Tach Slider	List	Blocks	Logged
Air Fuel Ratio	AFR	AFR	No	Yes	No	Yes	Yes	Yes
Battery Voltage	Battery Voltage	BATT	No	Yes	No	Yes	Yes	Yes
Cam Angle 1	Cam Angle 1	CAM1	No	No	No	Yes	Yes	Yes
Cam Angle 2	Cam Angle 2	CAM2	No	No	No	Yes	Yes	Yes
Charge Temperature	Charge Temp	CTMP	No	Yes	No	Yes	Yes	Yes
Coolant Temperature	Coolant Temp	CLT	No	Yes	No	Yes	Yes	Yes
Engine RPM	RPM	RPM	Yes	No	Yes	Yes	Yes	Yes
Error Codes 1	Error 1	NA	No	No	No	No	No	Yes
Error Codes 2	Error 2	NA	No	No	No	No	No	Yes
Error Codes 3	Error 3	NA	No	No	No	No	No	Yes
Error Codes 4	Error 4	NA	No	No	No	No	No	Yes
Error Codes 5	Error 5	NA	No	No	No	No	No	Yes
Error Codes 6	Error 6	NA	No	No	No	No	No	Yes
Error Codes 7	Error 7	NA	No	No	No	No	No	Yes
Error Codes 8	Error 8	NA	No	No	No	No	No	Yes
Exhaust Back Pressure	Back Pressure	EXBP	No	No	No	Yes	Yes	Yes
Ignition Advance	Advance	ADV	No	Yes	No	Yes	Yes	Yes
Injector Duration	Injector Pulse Width	INDUR	No	Yes	No	Yes	Yes	Yes
Intake Air Temperature	IAT	ITMP	No	Yes	No	Yes	Yes	Yes
Knock Retard	Knock Retard	KNKR	No	Yes	No	Yes	Yes	Yes
Manifold Pressure	MAP	MAP	No	Yes	No	Yes	Yes	Yes
Spare Speed	Spare Speed	SPD2	Yes	No	No	Yes	Yes	Yes
Throttle Position	TPS	TPS	No	Yes	No	Yes	Yes	Yes
Vehicle Speed	VCC	VSS	Yes	No	No	Yes	Yes	Yes

Table 3: Autronic SMC4 Data Properties

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Parameter	Data Log Title	Label	Big Gauge	Small Gauge	Tach Slider	List	Blocks	Logged
Analog Input 1	User (Analog Input 1)	AFR	No	Yes	No	Yes	Yes	Yes
Analog Input 2	User (Analog Input 2)	BATT	No	Yes	No	Yes	Yes	Yes
Analog Input 3	User (Analog Input 3)	CAM1	No	Yes	No	Yes	Yes	Yes
Analog Input 4	User (Analog Input 4)	CAM2	No	Yes	No	Yes	Yes	Yes
Analog Input 5	User (Analog Input 5)	CTMP	No	Yes	No	Yes	Yes	Yes
Analog Input 6	User (Analog Input 6)	CLT	No	Yes	No	Yes	Yes	Yes
Analog Input 7	User (Analog Input 7)	RPM	No	Yes	No	Yes	Yes	Yes
Analog Input 8	User (Analog Input 8)	NA	No	Yes	No	Yes	Yes	Yes
Battery Voltage	Battery Voltage	BATT	No	No	No	Yes	Yes	Yes
Board Temperature	Board Temperature	DTMP	No	No	No	Yes	Yes	Yes
Boost Stage	Boost Stage	BSTG	No	No	No	Yes	Yes	Yes
Calculated Gear	Gear	CGER	No	No	No	Yes	Yes	Yes
Current Time	NA	TIME	No	No	No	Yes	Yes	Yes
Derivative	Derivative	NA	No	No	No	No	No	Yes
Derivative Gain	Kd	NA	No	No	No	No	No	Yes
Filtered Boost	Filtered Boost	NA	No	No	No	No	No	Yes
Integral	Integral	NA	No	No	No	No	No	Yes
Integral Gain	Ki	NA	No	No	No	No	No	Yes
PID 16	PID 16	NA	No	No	No	No	No	Yes
Proportional	Proportional	NA	No	No	No	No	No	Yes
Proportional Gain	Kp	NA	No	No	No	No	No	Yes
PWM 1	PWM1	PWM1	Yes	Yes	No	No	Yes	Yes
PWM 2	PWM2	PWM2	No	Yes	No	No	Yes	Yes
Speed Input 1	User (Speed Input 1)	User (SPD1)	Yes	No	Yes	Yes	Yes	Yes
Speed Input 2	User (Speed Input 2)	User (SPD2)	Yes	No	Yes	Yes	Yes	Yes
Target Boost	Target Boost	TBST	No	No	No	Yes	Yes	Yes

Table 4: On-Board Inputs Data Properties

Parameter	Data Log Title	Label	Big Gauge	Small Gauge	Tach Slider	List	Blocks	Logged
Actual Air Fuel Ratio	AFR	AAFR	No	Yes	No	Yes	Yes	Yes
Battery Voltage	Bat.V.	BATT	No	Yes	No	Yes	Yes	Yes
Coolant Temperature	CLT	CLT	No	Yes	No	Yes	Yes	Yes
Desired Air Fuel Ratio	DAFR	DAFR	No	Yes	No	Yes	Yes	Yes
EGO Correction	EGOC	EGOC	No	Yes	No	Yes	Yes	Yes
EGO Voltage	EGO V	EGOV	No	Yes	No	Yes	Yes	Yes
Engine RPM	RPM	RPM	Yes	No	Yes	Yes	Yes	Yes
Gama	GAMA	GAMA	No	No	No	Yes	Yes	Yes
General Purpose Output 1	GPO	GPO1	No	Yes	No	Yes	Yes	Yes
Ignition Advance	Advance	ADV	No	Yes	No	Yes	Yes	Yes
Knock	Knock	KNK	No	Yes	No	Yes	Yes	Yes
Manifold Air Temperature	MAT	MAT	No	Yes	No	Yes	Yes	Yes
Manifold Pressure	MAP	MAP	No	Yes	No	Yes	Yes	Yes
Primary Pulsewidth	Pulse Width	PPW	No	Yes	No	Yes	Yes	Yes
Throttle Position	TPS	TPS	No	Yes	No	Yes	Yes	Yes

Table 5: Electromotive TEC 2 Data Properties

Parameter	Data Log Title	Label	Big Gauge	Small Gauge	Tach Slider	List	Blocks	Logged
Actual Air Fuel Ratio	AFR	AAFR	No	Yes	No	Yes	Yes	Yes
Analog Input 1	Analog 1	AD1	No	Yes	No	Yes	Yes	Yes
Analog Input 2	Analog 2	AD2	No	Yes	No	Yes	Yes	Yes
Analog Input 3	Analog 3	AD3	No	Yes	No	Yes	Yes	Yes
Analog Input 4	Analog 4	AD4	No	Yes	No	Yes	Yes	Yes
Battery Voltage	Bat. V.	BATT	No	Yes	No	Yes	Yes	Yes
Coolant Temperature	CLT	CLT	No	Yes	No	Yes	Yes	Yes
Desired Air Fuel Ratio	DAFR	DAFR	No	Yes	No	Yes	Yes	Yes
EGO Correction	EGOC	EGOC	No	Yes	No	Yes	Yes	Yes
EGO Voltage	EGO V	EGOV	No	Yes	No	Yes	Yes	Yes
Engine RPM	RPM	RPM	Yes	No	Yes	Yes	Yes	Yes
General Purpose Output 1	GPO 1	GPO1	No	Yes	No	Yes	Yes	Yes
General Purpose Output 2	GPO 2	GPO2	No	Yes	No	Yes	Yes	Yes
General Purpose Output 3	NA	GPO3	No	No	No	Yes	Yes	No
General Purpose Output 4	NA	GPO4	No	No	No	Yes	Yes	No
Ignition Advance	Advance	ADV	No	Yes	No	Yes	Yes	Yes
Knock	Knock	KNK	No	Yes	No	Yes	Yes	Yes
Knock Retard	KNK R	KNKR	No	Yes	No	Yes	Yes	Yes
Manifold Air Temperature	MAT	MAT	No	Yes	No	Yes	Yes	Yes
Manifold Pressure	MAP	MAP	No	Yes	No	Yes	Yes	Yes
Primary Pulsewidth	Primary PW	PPW	No	Yes	No	Yes	Yes	Yes
Secondary Ignition Advance	Sec ADV	SADV	No	Yes	No	Yes	Yes	Yes
Staged Pulsewidth	Staged PW	SPW	No	Yes	No	Yes	Yes	Yes
Throttle Position	TPS	TPS	No	Yes	No	Yes	Yes	Yes
Total Fundamental Pulsewidth	TFPW	TFPW	No	No	No	Yes	Yes	Yes

Table 6: Electromotive TEC3 Data Properties

Ph: 804.227.3023
10511 Old Ridge Rd. Ashland, VA 23005

Parameter	Data Log Title	Label	Big Gauge	Small Gauge	Tach Slider	List	Blocks	Logged
Engine RPM	RPM	RPM	Yes	No	Yes	Yes	Yes	Yes
Manifold Pressure	MAP	MAP	No	Yes	No	Yes	Yes	Yes
Throttle Position	TPS	TPS	No	Yes	No	Yes	Yes	Yes
Ignition Advance	Advance	ADV	No	Yes	No	Yes	Yes	Yes
Secondary Ignition Adavance	SEC ADV	SADV	No	Yes	No	Yes	Yes	Yes
Primary Pulsewidth	PW	PPW	No	Yes	No	Yes	Yes	Yes
Secondary Pulsewidth	S PW	SPW	No	Yes	No	Yes	Yes	Yes
GAMA	GAMA	GAMA	No	No	No	Yes	Yes	Yes
EGO Voltage	EGO V	EGOV	No	Yes	No	Yes	Yes	Yes
Knock	KNK	KNK	No	No	No	Yes	Yes	Yes
Actual Air Fuel Ratio	AAFR	AAFR	No	Yes	No	Yes	Yes	Yes
Desired Air Fuel Ratio	DAFR	DAFR	No	Yes	No	Yes	Yes	Yes
EGO Correction	EGO C	EGOC	No	Yes	No	Yes	Yes	Yes
Knock Retard	KNK R	KNKR	No	No	No	Yes	Yes	Yes
Coolant Temp	CLT	CLT	No	Yes	No	Yes	Yes	Yes
Manifold Air Temp	MAT	MAT	No	Yes	No	Yes	Yes	Yes
Battery Voltage	BAT	BATT	No	Yes	No	Yes	Yes	Yes
Idle Air Control Position	IAC POS	IACP	No	No	No	Yes	Yes	Yes
General Purpose Input Output	GPIO1	GPIO1	No	No	No	Yes	Yes	Yes
General Purpose Input Output	GPIO2	GPIO2	No	No	No	Yes	Yes	Yes
General Purpose Input Output	GPIO3	GPIO3	No	No	No	Yes	Yes	Yes
General Purpose Input Output	GPIO4	GPIO4	No	No	No	Yes	Yes	Yes
General Purpose Input Output	GPIO5	GPIO5	No	No	No	Yes	Yes	Yes
General Purpose Input Output	GPIO6	GPIO6	No	No	No	Yes	Yes	Yes
General Purpose Input Output	GPIO7	GPIO7	No	No	No	Yes	Yes	Yes
General Purpose Input Output	GPIO8	GPIO8	No	No	No	Yes	Yes	Yes
General Purpose Input Output	GPIO9	GPIO9	No	No	No	Yes	Yes	Yes

Table 7: Electromotive TEC GT Data Properties

Parameter	Data Log Title	Label	Big Gauge	Small Gauge	Tach Slider	List	Blocks	Logged
Engine RPM	RPM	RPM	Yes	No	Yes	Yes	Yes	Yes
Manifold Presure	MAP	MAP	No	No	No	Yes	Yes	Yes
Throttle Position	TPS	TPS	No	Yes	No	Yes	Yes	Yes
Manifold Air Temp	MAT	MAT	No	Yes	No	Yes	Yes	Yes
Coolant Temp	CLT	CLT	No	Yes	No	Yes	Yes	Yes
Ignition Advance	Spark BTDC	ADV	No	Yes	No	Yes	Yes	Yes
Pulsewidth	Pulsewidth	PW	No	Yes	No	Yes	Yes	Yes
Battery Voltage	BATT	BATT	No	Yes	No	Yes	Yes	Yes
Air Fuel Ratio	Actual AFR	AFR	No	Yes	No	Yes	Yes	Yes
EGO Correction	O2 Correction	EGOC	No	Yes	No	Yes	Yes	Yes
Power Adder Stage	Power Adder Stage	PASTG	No	No	No	Yes	Yes	Yes
Power Adder Retard	Power Adder Retard	PARET	No	Yes	No	Yes	Yes	Yes

Table 5: Electromotive TEC 2 Data Properties

Parameter	Data Log Title	Label	Big Gauge	Small Gauge	Tach Slider	List	Blocks	Logged
Actual Air Fuel Ratio	Actual AFR	AAFR	No	Yes	No	Yes	Yes	Yes
Analog Input 1	Aux Analog 1	AD1	No	Yes	No	Yes	Yes	Yes
Analog Input 2	Aux Analog 2	AD2	No	Yes	No	Yes	Yes	Yes
Analog Input 3	Aux Analog 3	AD3	No	Yes	No	Yes	Yes	Yes
Analog Input 4	Aux Analog 4	AD4	No	Yes	No	Yes	Yes	Yes
Analog Input 5	Aux Analog 5	AD5	No	Yes	No	Yes	Yes	Yes
Analog Input 6	Aux Analog 6	AD6	No	Yes	No	Yes	Yes	Yes
Analog Input 7	Aux Analog 7	AD7	No	Yes	No	Yes	Yes	Yes
Analog Input 8	Aux Analog 8	AD8	No	Yes	No	Yes	Yes	Yes
Auxillary RPM	AUX RPM	ARPM	Yes	No	Yes	Yes	Yes	Yes
Battery Voltage	Ignition Voltage	BATT	No	Yes	No	Yes	Yes	Yes
Boost Duty Cycle	Boost DC	BSDC	No	Yes	No	Yes	Yes	Yes
Coolant Temperature	CLT	CLT	No	Yes	No	Yes	Yes	Yes
Desired Air Fuel Ratio	Target AFR	DAFR	No	Yes	No	Yes	Yes	Yes
Driveshaft RPM	DS RPM	DRPM	Yes	No	Yes	Yes	Yes	Yes
EGO Correction	O2 Correction	EGOC	No	Yes	No	Yes	Yes	Yes
EGR Duty Cycle	EGR DC	EGR	No	Yes	No	Yes	Yes	Yes
Engine RPM	RPM	RPM	Yes	No	Yes	Yes	Yes	Yes
Fuel Economy	MPG	ECON	No	No	No	Yes	Yes	Yes
Fuel Flow	Lbs/Hr	FLFW	No	No	No	Yes	Yes	Yes
Idle Air Control Motor	IAC Position	IAC	No	No	No	Yes	Yes	Yes
Ignition Advance	Spark Advance	ADV	No	Yes	No	Yes	Yes	Yes
Injector Duty Cycle	Injector DC	INJ	No	Yes	No	Yes	Yes	Yes
Knock Retard	ESC Retard	KNKR	No	Yes	No	Yes	Yes	Yes
Manifold Air Pressure	MAP	MAP	No	Yes	No	Yes	Yes	Yes
Manifold Air Temperature	MAT	MAT	No	Yes	No	Yes	Yes	Yes
Power Adder Ramp Retard	PA Ramp Retard	PARP	No	Yes	No	Yes	Yes	Yes
Power Adder Retard	PA Retard	PART	No	No	No	Yes	Yes	Yes
Power Adder Stage	PA Stage	PASG	No	No	No	Yes	Yes	Yes
Pulsewidth	Base PW	PW	No	Yes	No	Yes	Yes	Yes
Throttle Position	TPS	TPS	No	Yes	No	Yes	Yes	Yes
Vehicle Speed	VSS	VSS	Yes	No	No	Yes	Yes	Yes
Volumetric Efficiency	Vol. Efficiency	VE	No	No	No	Yes	Yes	Yes

Table 9: FAST XFI Data Properties

Ph: 804.227.3023
10511 Old Ridge Rd. Ashland, VA 23005

Parameter	Data Log Title	Label	Big Gauge	Small Gauge	Tach Slider	List	Blocks	Logged
Elevation	Elevation	NA	No	No	No	No	No	Yes
Fix Dimension	Fix Dimension	NA	No	No	No	No	No	Yes
Latitude	Latitude	NA	No	No	No	No	No	Yes
Longitude	Longitude	NA	No	No	No	No	No	Yes
Magnetic Course	Magnetic Course	NA	No	No	No	No	No	Yes
Quality	Quality	NA	No	No	No	No	No	Yes
Satellite Mode	Satellite Mode	NA	No	No	No	No	No	Yes
Speed Over Ground	Speed Over Ground	NA	No	No	No	No	No	Yes
Status	Status	NA	No	No	No	No	No	Yes
Tracking Satellites	Tracking Satellites	NA	No	No	No	No	No	Yes
True Course	True Course	NA	No	No	No	No	No	Yes
UTC Date	UTC Date	NA	No	No	No	No	No	Yes
UTC Time	UTC Time	NA	No	No	No	No	No	

Table 10: Garmin GPS Data Properties

Parameter	Data Log Title	Label	Big Gauge	Small Gauge	Tach Slider	List	Blocks	Logged
Air Fuel Ratio	Actual AFR	AAFR	No	No	No	Yes	Yes	Yes

Table 11: Innovate Wideband Data Properties

Parameter	Data Log Title	Label	Big Gauge	Small Gauge	Tach Slider	List	Blocks	Logged
Engine RPM	RPM	RPM	Yes	No	Yes	Yes	Yes	Yes
Throttle Position	TPS	TPS	No	Yes	No	Yes	Yes	Yes
Manifold Pressure	MAP	MAP	No	Yes	No	Yes	Yes	Yes
Coolant Temp	CLT	CLT	No	Yes	No	Yes	Yes	Yes
Manifold Air Temp	MAT	MAT	No	Yes	No	Yes	Yes	Yes
Air Fuel Ratio	AFR	AFR	No	Yes	No	Yes	Yes	Yes
Ignition Advance	ADV	ADV	No	Yes	No	Yes	Yes	Yes
Battery Voltage	BATT	BATT	No	Yes	No	Yes	Yes	Yes
Pulsewidth	Pulsewidth	PPW	No	Yes	No	Yes	Yes	Yes
Digital Input 1	DIN1	DIN1	No	No	No	Yes	Yes	Yes

Table 12: Microtech Data Properties

Parameter	Data Log Title	Label	Big Gauge	Small Gauge	Tach Slider	List	Blocks	Logged
Engine RPM	RPM	RPM	Yes	No	Yes	Yes	Yes	Yes
Throttle Position	TPS	TPS	No	Yes	No	Yes	Yes	Yes
Manifold Pressure	MAP	MAP	No	No	No	Yes	Yes	Yes
Manifold Air Temp	MAT	MAT	No	Yes	No	Yes	Yes	Yes
Lambda 1	Lambda1	AFR1	No	Yes	No	Yes	Yes	Yes
Lambda 2	Lambda2	AFR2	No	Yes	No	Yes	Yes	Yes
Exhaust Pressure	Exhaust Pressure	EXPR	No	Yes	No	Yes	Yes	Yes
Mass Air Flow	MAF	MAF	No	No	No	Yes	Yes	Yes
Fuel Pressure	Fuel Pressure	FPRS	No	Yes	No	Yes	Yes	Yes
Oil Temp	Oil Temp	OTMP	No	Yes	No	Yes	Yes	Yes
Oil Pressure	Oil Pressure	OPRS	No	Yes	No	Yes	Yes	Yes
Exhaust Gas Temp 1	EGT 1	EGT1	No	No	No	Yes	Yes	Yes
Exhaust Gas Temp 2	EGT 2	EGT2	No	No	No	Yes	Yes	Yes
Battery Voltage	Battery Voltage	BATT	No	Yes	No	Yes	Yes	Yes
ECU Internal Temp	ECU Temperature	ETMP	No	Yes	No	Yes	Yes	Yes
Left Drive Speed	Speed 1	SPD1	Yes	No	Yes	Yes	Yes	Yes
Left Ground Speed	Speed 2	SPD2	Yes	No	Yes	Yes	Yes	Yes
Right Drive Speed	Speed 3	SPD3	Yes	No	Yes	Yes	Yes	Yes
Right Ground Speed	Speed 4	SPD4	Yes	No	Yes	Yes	Yes	Yes
Drive Speed	Driven Speed	DSPD	Yes	No	Yes	Yes	Yes	Yes
Ground Speed	Ground Speed	GSPD	Yes	No	Yes	Yes	Yes	Yes
Fuel Cut Level	Fuel Cut Level	FCUT	No	Yes	No	Yes	Yes	Yes
Ignition Advance	Ignition Advance	ADV	No	No	No	Yes	Yes	Yes
Load Point	Load Point	LDPT	No	No	No	Yes	Yes	Yes
Efficiency Point	Efficiency Point	EFPT	No	No	No	Yes	Yes	Yes
Fuel Used	Fuel Used	FUEL	No	No	No	Yes	Yes	Yes
Fuel Actual Pulse Width	Fuel Actual PW	PW	No	Yes	No	Yes	Yes	Yes
Fuel Effective Pulse Width	Effective PW	EFPW	No	Yes	No	Yes	Yes	Yes
Fuel Injectory Duty Cycle	Injector Duty Cycle	DUTY	No	No	No	Yes	Yes	Yes
Gear	Gear	GEAR	No	No	No	Yes	Yes	Yes
User Channel 1-4	User Channel 1-4	NA	No	No	No	No	No	Yes

Table 13: Motec ECU Data Properties

Ph: 804.227.3023
10511 Old Ridge Rd. Ashland, VA 23005

Parameter	Data Log Title	Label	Big Gauge	Small Gauge	Tach Slider	List	Blocks	Logged
4WD Low Enabled	4WD Low	NA	No	No	No	No	No	Yes
Accumulator Pressure	Accumulator Pressure	APRS	No	Yes	No	Yes	Yes	Yes
Analog Input 1	Analog 1	AD1	No	Yes	No	Yes	Yes	Yes
Analog Input 2	Analog 2	AD2	No	Yes	No	Yes	Yes	Yes
Analog Input 3	Analog 3	AD3	No	Yes	No	Yes	Yes	Yes
Analog Input 4	Analog 4	AD4	No	Yes	No	Yes	Yes	Yes
Analog Input 5	Analog 5	AD5	No	Yes	No	Yes	Yes	Yes
Analog Input 6	Analog 6	AD6	No	Yes	No	Yes	Yes	Yes
Analog Input 7	Analog 7	AD7	No	Yes	No	Yes	Yes	Yes
Analog Input 8	Analog 8	AD8	No	Yes	No	Yes	Yes	Yes
Analog Input Failure	Analog Failure	NA	No	No	No	No	No	Yes
Calibration B	Calibration B	NA	No	No	No	No	No	Yes
Call TCC Lockup	Cancel TCC Lockup	NA	No	No	No	No	No	Yes
Cancel Overdrive	NA	NA	No	No	No	No	No	Yes
Coolant Temp	CLT	CLT	No	Yes	No	Yes	Yes	Ye
Current Gear	Current Gear	CGER	No	Yes	No	Yes	Yes	Yes
Desired Gear	Desired Gear	DGER	No	No	No	Yes	Yes	Yes
Digital Input 1 - 16	Digital Input 1 - 16	DIN1-16	No	No	No	Yes	Yes	Yes
Digital Output 1 - 3	Digital Output 4	DO1-3	No	No	No	Yes	Yes	Yes
Disable TCC Lockup	Disable TCC Lockup	NA	No	No	No	No	No	Yes
Dyno Mode	Dyno Mode	NA	No	No	No	No	No	Yes
Engine RPM	RPM	RPM	Yes	No	Yes	Yes	Yes	Yes
Fluid Temp 1	Fluid Temp 1	TMP1	No	Yes	No	Yes	Yes	Yes
Fluid Temp 2	Fluid Temp 2	TMP2	No	Yes	No	Yes	Yes	Yes
Lever Position	Lever Position	LPOS	No	Yes	No	Yes	Yes	Yes
Line Pressure	Line Pressure	LPRS	No	Yes	No	Yes	Yes	Yes
Manifold Pressure	MAP	MAP	No	Yes	No	Yes	Yes	Yes
PWM 1	PWM 1	PWM1	No	Yes	No	Yes	Yes	Yes
PWM 2	PWM 2	PWM2	No	Yes	No	Yes	Yes	Yes
PWM 3	PWM 3	PWM3	No	Yes	No	Yes	Yes	Yes
PWM 4	PWM 4	PWM4	No	Yes	No	Yes	Yes	Yes
PWM 5	PWM 5	PWM5	No	Yes	No	Yes	Yes	Yes
PWM 6	PWM 6	PWM6	No	Yes	No	Yes	Yes	Yes
Shaft RPM	Driveshaft RPM	SRPM	Yes	No	Yes	Yes	Yes	Yes
Simple Manual Mode	Simple Manual Mode	NA	No	No	No	No	No	Yes
Snow Mode	Snow Mode	NA	No	No	No	No	No	Yes
Speed Input 1	Speed 1	SPD1	Yes	No	Yes	Yes	Yes	Yes
Speed Input 2	Speed 2	SPD2	Yes	No	Yes	Yes	Yes	Yes
Speed Input 3	Speed 3	SPD3	Yes	No	Yes	Yes	Yes	Yes
Speed Input 4	Speed 4	SPD4	Yes	No	Yes	Yes	Yes	Yes
TCC Lockup Rate %	TCC Duty	TCC%	No	Yes	No	Yes	Yes	Yes
Throttle Position	TPS	TPS	No	Yes	No	Yes	Yes	Yes
Torque Converter Lockup	TCC Lockup	NA	No	No	No	No	No	Yes
Torque Converter Slip	Torque Converter Slip %	TSLP	No	Yes	No	Yes	Yes	Yes
Transmission Slip	Transmission Slip %	CSLP	No	Yes	No	Yes	Yes	Yes
True Manual Mode	True Manual Mode	NA	No	No	No	No	No	Yes
Turbine Speed	Turbine Speed	TRPM	Yes	No	Yes	Yes	Yes	Yes
Vehicle Slippage	Vehicle Slip %	VSLP	No	Yes	No	Yes	Yes	Yes
Vehicle Speed 1	VSS	VSS	Yes	No	No	Yes	Yes	Yes
Vehicle Speed 2	VSS2	VSS2	Yes	No	No	Yes	Yes	Yes
Wide Open Throttle	Wide Open Throttle	NA	No	No	No	No	No	Yes

Table 14: PCS Transmission Controller Data Properties

Parameter	Data Log Title	Label	Big Gauge	Small Gauge	Tach Slider	List	Blocks	Logged
Air Fuel Ratio 1	Wideband AFR 1	AFR1	No	Yes	No	Yes	Yes	Yes
Air Fuel Ratio 2	Wideband AFR 2	AFR2	No	Yes	No	Yes	Yes	Yes
Analog Input 1	Analog 1	AD1	No	Yes	No	Yes	Yes	Yes
Analog Input 2	Analog 2	AD2	No	Yes	No	Yes	Yes	Yes
Analog Input 3	Analog 3	AD3	No	Yes	No	Yes	Yes	Yes
Analog Input 4	Analog 4	AD4	No	Yes	No	Yes	Yes	Yes
Analog Input 5	Analog 5	AD5	No	Yes	No	Yes	Yes	Yes
Analog Input 6	Analog 6	AD6	No	Yes	No	Yes	Yes	Yes
Analog Input 7	Analog 7	AD7	No	Yes	No	Yes	Yes	Yes
Analog Input 8	Analog 8	AD8	No	Yes	No	Yes	Yes	Yes
Bank 1 Output	O2 Bank 1 Out	BK1O	No	Yes	No	Yes	Yes	Yes
Bank 2 Output	O2 Bank 2 Out	BK2O	No	Yes	No	Yes	Yes	Yes
Engine RPM	RPM	RPM	Yes	No	Yes	Yes	Yes	Yes
Frequency MAF	KVMAF	FMAF	No	No	No	Yes	Yes	Yes
Fuel Pressure	Fuel Press.	FPRS	No	Yes	No	Yes	Yes	Yes
Fuel Pump Duty Cycle	Pump Duty	PDTY	No	Yes	No	Yes	Yes	Yes
MAF	MAF	MAF	No	Yes	No	Yes	Yes	Yes
MAF Output 1	MAF Output 1	MFO1	No	Yes	No	Yes	Yes	Yes
MAF Output 2	MAF Output 2	MFO2	No	Yes	No	Yes	Yes	Yes
Manifold Pressure	MAP	MAP	No	Yes	No	Yes	Yes	Yes
Oxygen Sensor Bank 1	Narrow AFR 1	O2B1	No	Yes	No	Yes	Yes	Yes
Oxygen Sensor Bank 2	Narrow AFR2	O2B2	No	Yes	No	Yes	Yes	Yes
PWM 1	PWM 1	PWM1	No	Yes	No	Yes	Yes	Yes
PWM 2	PWM 2	PWM2	No	Yes	No	Yes	Yes	Yes
Speed Input 1	Speed 1	SPD1	Yes	No	Yes	Yes	Yes	Yes
Speed Input 2	Speed 2	SPD2	Yes	No	Yes	Yes	Yes	Yes
Target Air Fuel Ratio	Target AFR	TAFR	No	Yes	No	Yes	Yes	Yes
Target Pressure	Target Fuel Pressure	TPRS	No	Yes	No	Yes	Yes	Yes
Temperature Trim 1	Temp Trim 1	TMP1	No	Yes	No	Yes	Yes	Yes
Temperature Trim 2	Temp Trim 2	TMP2	No	Yes	No	Yes	Yes	Yes
Throttle Position	TPS	TPS	No	Yes	No	Yes	Yes	Yes
Vehicle Speed	VSS	VSS	Yes	No	No	Yes	Yes	Yes

Table 15: PCS XFC Data Properties

Parameter	Data Log Title	Label	Big Gauge	Small Gauge	Tach Slider	List	Blocks	Logged
X Axis G-Force	Accel X Gs	XAXIS	No	No	No	Yes	Yes	Yes
Y Axis G-Force	Accel Y Gs	YAXIS	No	No	No	Yes	Yes	Yes
Z Axis G-Force	Accel Z Gs	ZAXIS	No	No	No	Yes	Yes	Yes

Table 16: PCS Accelerometer Data Properties

Ph: 804.227.3023
10511 Old Ridge Rd. Ashland, VA 23005

Parameter	Data Log Title	Label	Big Gauge	Small Gauge	Tach Slider	List	Blocks	Logged
EGT Channel 1	EGT 1	EGT1	No	No	No	Yes	Yes	Yes
EGT Channel 2	EGT 2	EGT2	No	No	No	Yes	Yes	Yes
EGT Channel 3	EGT 3	EGT3	No	No	No	Yes	Yes	Yes
EGT Channel 4	EGT 4	EGT4	No	No	No	Yes	Yes	Yes
EGT Channel 5	EGT 5	EGT5	No	No	No	Yes	Yes	Yes
EGT Channel 6	EGT 6	EGT6	No	No	No	Yes	Yes	Yes
EGT Channel 7	EGT 7	EGT7	No	No	No	Yes	Yes	Yes
EGT Channel 8	EGT 8	EGT1	No	No	No	Yes	Yes	Yes
Average 1	Avg. EGT 1	AEGT1	No	No	No	Yes	Yes	Yes
Average 2	Avg. EGT 2	AEGT2	No	No	No	Yes	Yes	Yes
Average 3	Avg. EGT 3	AEGT3	No	No	No	Yes	Yes	Yes
Average 4	Avg. EGT 4	AEGT4	No	No	No	Yes	Yes	Yes
EGT Channel 9	EGT 9	EGT9	No	No	No	Yes	Yes	Yes
EGT Channel 10	EGT 10	EGT10	No	No	No	Yes	Yes	Yes
EGT Channel 11	EGT 11	EGT11	No	No	No	Yes	Yes	Yes
EGT Channel 12	EGT 12	EGT12	No	No	No	Yes	Yes	Yes
EGT Channel 13	EGT 13	EGT13	No	No	No	Yes	Yes	Yes
EGT Channel 14	EGT 14	EGT14	No	No	No	Yes	Yes	Yes
EGT Channel 15	EGT 15	EGT15	No	No	No	Yes	Yes	Yes
EGT Channel 16	EGT 16	EGT16	No	No	No	Yes	Yes	Yes
Average 5	Avg. EGT 5	AEGT5	No	No	No	Yes	Yes	Yes
Average 6	Avg. EGT 6	AEGT6	No	No	No	Yes	Yes	Yes
Average 7	Avg. EGT 7	AEGT7	No	No	No	Yes	Yes	Yes
Average 8	Avg. EGT 8	AEGT8	No	No	No	Yes	Yes	Yes

Table 17: PCS EGT Module Data Properties

Parameter	Data Log Title	Label	Big Gauge	Small Gauge	Tach Slider	List	Blocks	Logged
Engine RPM	RPM	RPM	Yes	No	Yes	Yes	Yes	Yes
Manifold Pressure	MAP Sensor Voltage	MAP	No	Yes	No	Yes	Yes	Yes
Coolant Temp	CLT	CLT	No	Yes	No	Yes	Yes	Yes
Throttle Position	TPS	TPS	No	Yes	No	Yes	Yes	Yes
Manifold Air Temp	Air Temp	MAT	No	Yes	No	Yes	Yes	Yes
Digital Input 1	Digital In 1	DIN1	No	No	No	Yes	Yes	Yes
Digital Input 2	Digital In 2	DIN2	No	No	No	Yes	Yes	Yes
Oxygen Sensor Voltage 1	OS #1	O2V1	No	Yes	No	Yes	Yes	Yes
Oxygen Sensor Voltage 2	OS #2	O2V2	No	Yes	No	Yes	Yes	Yes
Injector Duration	Injection Time	IDUR	No	No	No	Yes	Yes	Yes
Exhaust Gas Temperature 1	EGT 1	EGT1	No	No	No	Yes	Yes	Yes
Exhaust Gas Temperature 2	EGT 2	EGT2	No	No	No	Yes	Yes	Yes
Exhaust Gas Temperature 3	EGT 3	EGT3	No	No	No	Yes	Yes	Yes
Exhaust Gas Temperature 4	EGT 4	EGT4	No	No	No	Yes	Yes	Yes
Exhaust Gas Temperature 5	EGT 5	EGT5	No	No	No	Yes	Yes	Yes
Exhaust Gas Temperature 6	EGT 6	EGT6	No	No	No	Yes	Yes	Yes
Exhaust Gas Temperature 7	EGT 7	EGT7	No	No	No	Yes	Yes	Yes
Exhaust Gas Temperature 8	EGT 8	EGT8	No	No	No	Yes	Yes	Yes
Analog Input 1	Auxillary Voltage #1	AD1	No	Yes	No	Yes	Yes	Yes
Analog Input 2	Auxillary Voltage #2	AD2	No	Yes	No	Yes	Yes	Yes
PWM 1	PWM 1	PWM1	No	Yes	No	Yes	Yes	Yes
PWM 2	PWM 2	PWM2	No	Yes	No	Yes	Yes	Yes
PWM 3	PWM 3	PWM3	No	Yes	No	Yes	Yes	Yes
PWM 4	PWM 4	PWM4	No	Yes	No	Yes	Yes	Yes
Vehicle Speed 1	VSS 1	VSS1	Yes	No	No	Yes	Yes	Yes
Vehicle Speed 2	VSS 2	VSS2	Yes	No	No	Yes	Yes	Yes
Battery Voltage	Batt	BATT	No	Yes	No	Yes	Yes	Yes

Table 18: Sakura FC-10 ECU Data Properties

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