

Edelbrock QwikData 2 Manual



This QwikData 2 manual is a complete guide to installing your QwikData 2 data system, configuring channels, calibrating sensors, communicating with the LCU and analyzing downloaded data.

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Introducing QwikData 2

Thank you for acquiring QwikData 2. You now have at your fingertips all the tools you'll need to manage your Data Acquisition applications! QwikData 2, and the individual development tools within QwikData 2 contain many features that make Data Acquisition a breeze.

Edelbrock's new QwikData 2 is a complete data acquisition system designed for a wide variety of motorsports. The system consists of a data logger unit, PC based software and various sensors. The system includes two built-in accelerometers to measure longitudinal and lateral acceleration, battery voltage, LCU internal temperature and up to 30 external inputs.

The QwikData 2's new software package offers the user a simple interface to access more data and feedback than ever before. Data downloads and transfer rates have also been improved with the addition of a USB connection. All the components inside the LCU are surface mounted to provide shock and vibration resistance along with reduced electrical noise and RFI interference. QwikData 2 is available in two versions; the Basic System comes equipped with 8 analog inputs, 4 thermistor type temperature sensor inputs, 2 digital inputs, a Tach Input, and 1 switched output. The Advanced Thermocouple System comes equipped with 12 analog inputs, 8 K type EGT sensor inputs, 4 thermistor type temperature sensor inputs, 5 digital inputs, a Tach Input and 2 switched outputs. An Advanced Analog Harness (all analog inputs) is available as an alternative to the Advanced Thermocouple Harness. Paired with the Basic Harness the Advanced Analog Harness provides 20 analog inputs, 4 thermistor type temperature sensor inputs, 4 digital inputs, a Tach Input and 2 switched outputs. The digital inputs can record on-off events and frequency (such as mph, rpm, and digital fuel flow sensors).

QwikData 2 is compatible with first generation QwikData sensors.

A logging table window enables the user to select channels for logging and set individual channel sample rates. Data sample rates are adjustable per channel from 1 to 1000 samples per second.

If you have any questions or issues with QwikData 2, you can contact our [QwikData 2 Technical Hotline](#) at 800-416-8628 from 7:00 am to 5:00 pm PST Monday thru Friday.

Edelbrock customers can now join others at <http://forums.edelbrock.com/forums/>. The forum offers support from current experienced users as well as Edelbrock Tech Reps.

We have worked to make this documentation easy to use, beginning with these links to places you can use as first stops in your search for information.

- Using the table of contents, follow the underlined topics through out this manual to detailed information regarding current subjects.
- [Getting Started](#) - Details regarding Help files, Bill of Materials, basic Personal Computer requirements and some examples of QwikData 2 systems to help better familiarize yourself with the power and capabilities of QwikData 2.
- [System Installation](#) - The topics in this chapter are included to help simplify your data acquisition system installation.
- [Harness Details](#) - Harness schematics, pin out designations and connector details for each system are available in this section.
- [Configuration](#) - Data logger, channel setup and calibration editor.
- [Data Analysis](#)- Data analysis, graphing, and custom reports application.
- [USB Communication](#)- Data logger monitor, download and configuration program.
- [Typical QwikData 2 System Examples](#) - See these examples of QwikData 2 Data Acquisition system.
- [Pre Outing Check-List](#) - This checklist may be useful for insuring a complete vehicle setup prior to a outing.

Finding Information

This page covers how to access all topics from the product documentation installed on your computer.

Product documentation can be located on the toolbar of your QwikData 2 software application by selecting Help and provides the following information:

- Access to the entire Table of Contents from your computer.
- Full-Text Search to look up topics.

The help documentation highlights the top features of each application and points to more in depth information.

Using Help

This page contains information about how to navigate and search through the many help topics that will assist you in getting started with QwikData 2.

To find more information, you can:

- Double-click one of the Help books on the left, then click a topic.
- Click the Index tab and enter a keyword.
- Click the Search tab and enter a phrase.

When working with this window, you can:

- Click Help Topics to show or hide the Contents panel on the left.
- Make the Contents panel bigger or smaller: click and drag the divider bar.
- Make this window bigger or smaller: click and drag the bottom left or right corner of this window.

When working from a hard copy of the installation instructions use the Table of contents to locate more detailed information regarding underlined topics.

Getting Started

The following is a guideline for configuring your logger. Details regarding the underlined topics are outlined in the following pages of this manual.

- Before loading software review the topics [USB Drivers](#) and [System Requirements](#).
- For information regarding harness and LCU installation in your vehicle, 12 volt power connections and logger activation switch refer to [System Installation](#).
- Review the [Instrumentation](#) and [Harness Details](#) section for information pertaining to connector location and pin out designations your system level.

The QwikData 2 data acquisition system is broken down into three parts:

- **Configuration** - Data logger, channel setup and calibration editor.
- **Data Analysis** - Data analysis, graphing, and custom reports application.
- **USB Communication** - Data logger monitor, download and configuration program.

After you have loaded your software Icons for each of the application will be placed on your desktop.

CONFIGURATION - 

DATA ANALYSIS - 

DATA COMMUNICATION - 

- Double click on any Icon to open the application.

NOTE: Many items in the Software Toolbars will be grayed out, these are reserved for functions in future software releases.

System Requirements

The system requirements for QwikData 2 are as follows:

- Pentium personal computer with 1GHz or higher processor.
- Microsoft Windows 2000 or later (Vista 64 not supported)..
- 256 MB of RAM (512 MB recommended) for Windows XP.

Hard disk space required for installation:

- Power to Win (50 MB Typical, 94 MB Maximum)

Additional system requirements:

- CD-ROM drive.
- VGA or higher-resolution monitor (Super VGA recommended).
- Microsoft Mouse or compatible pointing device.
- Universal Serial Bus (USB port).
- Microsoft Office Excel

Software Installation

This section contains information on installing QwikData 2 to your computer. It is recommended that you check the section on System Requirements before installing this product.

NOTE: Some files and components of QwikData 2 installation are referred to as Power To Win and EFI.

- 1) Insert the QwikData 2 software installation CD in your computers CD ROM Drive.
- 2) Select **Install Edelbrock QwikData 2**.
- 3) Setup will open and guide you thru the install procedure.
- 4) Do not change the default installation drive or path.
- 5) Click next to confirm installation.
- 6) When installation is finished "Installation complete" will display,
Select "**Close**" to exit.

*QwikData 2 Software installation is complete, three shortcut Icons for USB Comms, Config and Analysis have been placed on your desktop.



Notes: Included in the installation is a SAMPLE.DAT logger data file located at Power to Win\Data to help you familiarize yourself with the many features of QwikData 2.

USB Drivers

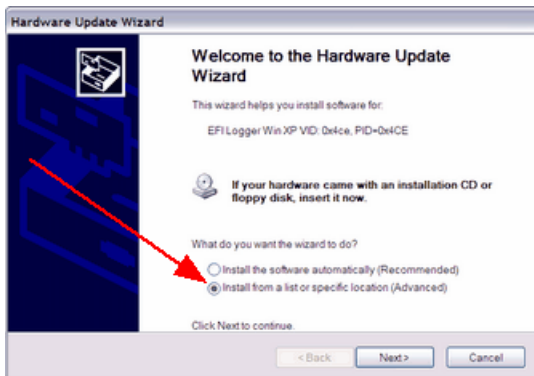
The QwikData 2 Power to Win install disk will copy the current device drivers during installation to your "C:\Power to Win" directory. Follow the instructions below to complete the installation of your USB drivers.

NOTE: Some files and components of QwikData 2 installation are referred to as Power To Win and EFI.

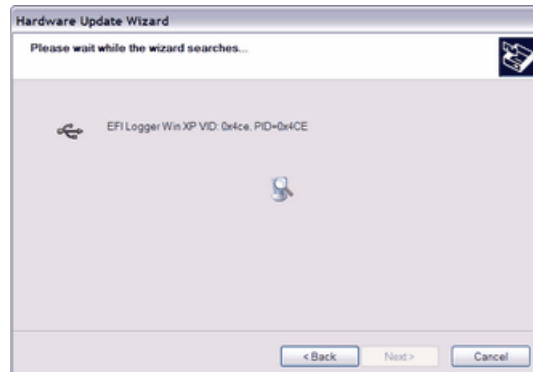
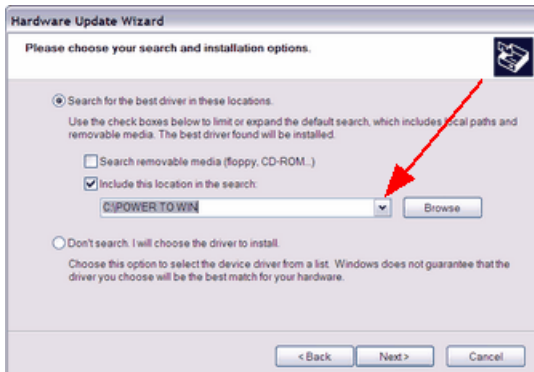
First Time Installation

USB Driver Initialization: Power up your Logger and connect to your Laptop with the USB cable. When connected the logger hardware will be detected and the "Found New Hardware" wizard will open. Follow the instructions to install the driver **making sure to point to the "C:\Power to Win" directory if prompted**.

1. From Hardware Update Wizard window select **Install from a specific location**. Select **Next** to continue.



2. Enter Path: **C:\Power To Win** or select from pull down in window. Select **Next** to continue. Update wizard will locate and setup necessary driver device.



Notes

- Drivers can only be installed or updated when the logger is powered up and connected to the USB port.

To Update Drivers

Power up your Logger and connect to your Laptop with the USB cable.

1. Click **Start** and select the **Control Panel icon**.
2. Select the **System** Icon.
3. Press the **Hardware** tab and select **Device Manager**.
4. Under the **Universal serial Bus** controllers list locate the existing EFI Logger device.

If the EFI Logger does not appear in the device list check that the logger is powered up and connected to the USB port. When running under Win XP some peripheral USB devices are known to corrupt older versions of the EFI Logger device driver and it may be necessary to uninstall the previous version before proceeding.

5. Right click and select **Update Driver**
6. Follow the instructions to install the new device driver.

Notes

- Drivers can only be installed or updated when the logger is powered up and connected to the USB port.
- If your computer is connected to a network, network policy settings might also prevent you from completing this procedure.

Performance Tips

Listed below are some ways to help improve the overall performance of this product on your computer.

- Turn off virus checking on Analysis.exe
- De fragment your hard drive after installing the product.
- Check the recommended RAM and processor requirements for this program, and consider upgrading your memory or disk speed.

File Types

The following table is a list of the installed file types, paths and descriptions.

| Name | Where | Comments |
|--------------|-------------------------|---|
| Analysis.exe | C:\Power to Win | logger data analysis application |
| Config.exe | C:\Power to Win | logger configuration application |
| Usbcoms.exe | C:\Power to Win | logger communication application |
| Settings.nsb | C:\Power to Win | default usb screen setup file |
| PowerTW.chm | C:\Power to Win | power to win help file |
| *.stp | C:\Power to Win\Libs | exported logger setup files |
| *.lib | C:\Power to Win\Libs | user defined setup library files |
| Excel.rpt | C:\Power to Win\Reports | user defined data analysis report files |
| Report.xls | C:\Power to Win\Reports | report template file |
| Sample.dat | C:\Power to Win\Data | sample logger data file |
| Channel.dsc | C:\Power to Win\Setup | logger channel descriptor file |
| @LCU1.cal | C:\Power to Win\Setup | logger car(1) setup file |
| ECU.cal | C:\Power to Win\Setup | ecu logger channel calibrations |
| 001.mdf | C:\Power to Win\Setup | comms control screen setup file |
| Mathchl.def | C:\Power to Win\Setup | logger math channel definition file |
| Constant.def | C:\Power to Win\Setup | logger math constant definition file |

System Installation

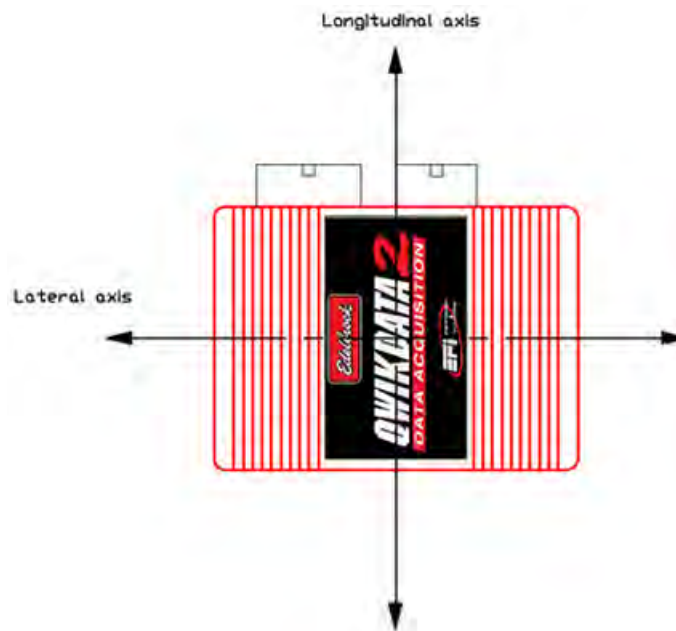
Once you have chosen the devices and accessories you need for your application, they need to be installed in the vehicle and properly wired.

The following topics in this chapter are included to help simplify your data acquisition system installation.

LCU Installation

When installing the LCU you should consider the following points:

- The LCU is resistant to water, oil and fuel, but after prolonged exposure to these elements they may eventually work their way inside the LCU.
- Select a mounting position where the LCU will not be in constant contact with any fluid.
- Make sure that air can flow over the LCU to keep it below +70°C
- Do not place the LCU near source of electrical interference e.g. ignition boxes, coils, plug leads, or alternators.
- Mount the LCU bracket to the vehicle, line the bracket with the supplied foam tape, secure the LCU in the bracket with supplied O-Ring. Note: If G-Load data is desirable, for Lateral and Longitudinal sensor data to read properly the LCU must be mounted in a specific orientation. It is advisable to mount the LCU parallel to the ground with the QwikData 2 label up and the harness connectors facing forward.



Harness Installation

To provide a splash-proof system and make installation as easy as possible, QwikData 2 uses high-grade water resistant connectors and an external wiring harness. To connect the harness to the LCU push the connectors directly into the LCU until you hear a "click". To remove the harness grasp the harness connector securely while depressing the two tabs located on the top and bottom of the connector and pull away from the LCU. The wiring harness is assembled with connectors that mate to the supplied sensors. Each sensor is connected to the QwikData 2 unit by simply mating the appropriate connectors.

Route the wiring harness as needed to make connections to the installed sensors. Avoid paralleling Data Log wires with any ignition wiring (primary or secondary). To connect the circular connectors on the wiring harness to the sensors, push the mating connectors firmly together and then turn the locking ring clockwise to lock the connectors together.

Refer to the [Harness Details](#) section for assistance with routing your harness.

Notes:

- Allow harnesses to follow their natural curvature. Do not force them around very tight radiuses.
- When a harness passes through a hole in the chassis or firewall, make sure that there is no risk of it being cut or damaged and is not routed near distributor or ignition secondary wires.
- When using tie-wraps avoid attaching harness to sharp or abrasive objects.

System Power Requirements

The LCU needs a switched supply voltage greater than 10.0 volts to power-up and between 9.0 volts and 18.0 volts to operate correctly. If the supply voltage is outside the 9.0 volts and 18.0 volts limits, the LCU will not function properly.

Power is connected to the QwikData2 using the Pink/Black (switched 12 volts) and Black (ground) wires on the wiring harness. Connect the Pink/Black wire to a switched 12Volt source (e.g. output of ignition switch) and the black wire to a good ground source. Do not connect the Pink/Black wire directly to the battery, as this will put a constant current draw on your battery when the logger is not in use. QwikData 2 does not need continual battery power to preserve data and configuration settings.

Avoiding RFI and EMI Interference:

When installing the QwikData2 data logger unit avoid RF and EMI interference and make sure all grounds are connected to a clean reliable ground source. Try to keep all data logger unit wiring as far as possible from ignition components and related wiring. Avoid paralleling data logger wires with any ignition wiring (primary or secondary). Do not mount the data logger unit next to ignition box or ignition components.

Data Logging On/Off Switch

With the QwikData 2 system, data logging can be started and stopped either automatically based on sensor values or manually with a switch(default configuration). If manual-logging is desired, a single pole on/off toggle switch must be installed in the vehicle and connected to the two logging control wires labeled "LOG SW" in the main harness. One wire should be connected to each terminal of the toggle switch. Data logging will start when the toggle switch is turned on (closing the circuit between the two wires) and stops when the switch is turned off. If the automatic data logging is configured the switch is not needed.

To enable manual log switch see Logging Table [Enable Conditions](#) in the Configuration section.

Logger Unit

Internal Channels

The LCU has four internal channels which can be monitored and logged in the same manner as the external analog or digital inputs. The battery voltage and box temps should be logged to keep track of the operating conditions of the LCU at all times.

The available internal channels are listed in the table below.

| <u>Channel</u> | <u>Description</u> | <u>Channel I.D</u> |
|----------------|---------------------------------|--------------------|
| Battery | LCU internal battery (volts) | 0000 |
| Box Temp | LCU internal case temp. (deg C) | 0002 |
| Longitudinal G | Longitudinal acceleration (G) | 0001 |
| Lateral G | Lateral acceleration (G) | 0003 |

Digital Inputs

Digital channels (also referred to as Frequency) can be used to measure RPM, Speed, Frequency, Pulse Counts and Digital Events. The QwikData 2 Basic System has 1 Tach Input and 1 digital input. Harness connectors are labeled Tach Input and Freq. 2. The QwikData 2 Advanced system has 4 digital channel inputs. Harness connectors are labeled Tach Input, Freq. 2, 3, and 4. The Tach Input and Digital Inputs 2 thru 4 are hi speed digital input channels. Digital #5 - Pin 15 of the 34 pin Basic LCU connector and Digital #6 - pin 26 of the Advanced 26 pin connector can be wired to as low resolution digital inputs. This input acts as a counter each time a digital event occurs (the counter resets to zero each time the logger power is cycled). For information regarding Tach Input or Digital Speed Sensor connections to a digital channel refer to examples [Connecting a Tach Input](#), [Connecting a Digital Speed Sensor](#).

Data Logger Options

The QwikData 2 Data Logger is capable of logging 24 analog and 6 digital channel inputs. 12 of the analog channels are analog only inputs. Analog channels 7 thru 10 and 17 thru 24 can be configured for thermistor type temperature sensor inputs or K type EGT thermocouple inputs. EGT K type and thermistor inputs require additional temperature adapter card. Adapter cards are available in different configurations. QwikData 2 Basic comes standard with 4 channel thermistor card.(no EGT inputs)

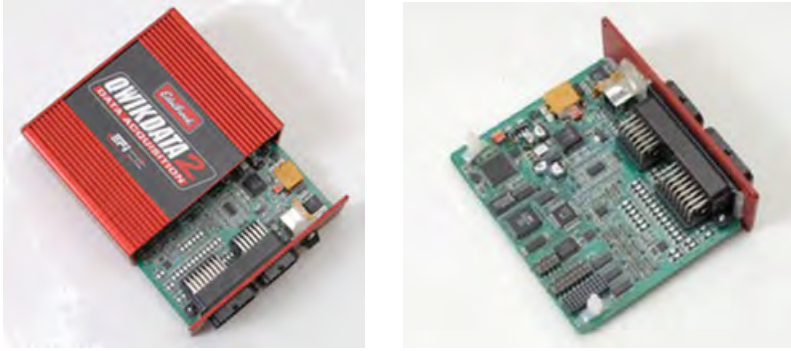
The main board inside the QwikData 2 enclosure holds two sets of D.I.P. switches. The set of 4 D.I.P switches configure channels 7 thru 10, the set of 8 D.I.P switches configure channels 17 thru 24. ON representing standard Analog channels configuration, OFF representing temperature adapter card configuration. If adapter card is installed D.I.P switches must be properly set for channels to function properly. Only switches representing channels available on Adapter Card should be enabled. See literature included with Adapter Card for proper D.I.P settings. The Advanced logger comes configured for 4 thermistor and 8 EGT channels (temperature adapter card included). Two QwikData 2 Advanced harness configurations are available. [QwikData 2 Advanced Thermocouple Harness](#) #91294 is available for 8 thermocouple 4 thermistor configuration or [QwikData 2 Advanced Analog Harness](#) #91291 for all Analog or Analog / Thermistor inputs. (temperature adapter card #91169 only necessary if 4 thermistor inputs desired).

Temperature Adapter Card Installation

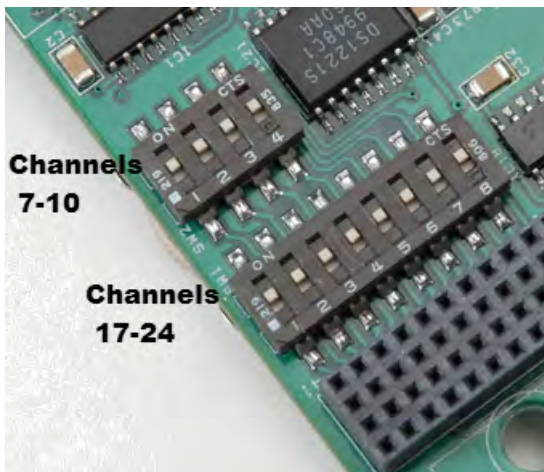
Different configuration Temperature Adapter Cards are available.

Installing Temperature Adapter Card is a simple procedure, all that is required is a clean bench covered with a soft surface, and a phillips screw driver.

- 1) Remove the LCU from the vehicle and wipe case clean.
- 2) Place LCU on clean soft surface and remove 4 phillips head screws from end plate on connector end of case. Do not remove phillips head screw located just above USB comms port.
- 3) Hold main body of case with one hand and slowly slide end plate with connectors and board outward with other hand until entire board is removed. Some pressure may be necessary to break loose silicone sealant.
- 4) Position assembly on flat soft surface with analog board facing up.



5) D.I.P switches are now exposed. Switches are small and delicate, positions are very easily adjusted with paper clip or small pointed device. The set of 4 D.I.P switches configure channels 7 thru 10, the set of 8 D.I P switches configure channels 17 thru 24. ON representing standard Analog channels configuration, OFF representing temperature adapter card configuration. **If adapter card is installed D.I.P switches must be properly set for channels to function properly. Only switches representing channels available on Adapter Card should be OFF.** See literature included with Adapter Card for proper D.I.P settings.



- 6) Install analog board. Analog board is supplied with two mounting legs. Install legs into main circuit board. Support analog board on ends near mounting legs, align legs with holes in board and pins to socket connector. Apply lite pressure to analog board until board is fully seated on legs and tangs are exposed.
- 7) Apply a thin bead of silicone to case end to help seal cover when fastened.
- 8) Slip board assembly back into case, be sure main board is supported in slots on either side inside case. Re install phillips head screws.

Configuration



Open the Configuration program by double clicking the Configuration Icon on your desktop.

The Configuration module is an advanced, yet intuitive development tool for managing all of your data logger setups. It features a file folder window to facilitate easy management and viewing of your setup files and their associated functions.

Setup files contain a [Channel Logging Table](#), [Outing Information](#), [Channel Data](#) and [Channel Calibrations](#) for up to 10 different cars.

A variety of tools are provided for setting up your data logger. Different setups can be created for each defined car to allow for differences in sensor packages and vehicle configurations. The setup screens have been designed to list the various logger functions into related groups for ease of use.

The [Logging Table](#) organizes the selected channels for logging, sample rates and logger start stop criteria's.

The [Register LCU](#) function organizes setup files and logged data download paths for specific LCU's by serial number. This allows the computer to access the appropriate setup(CAR ##) and calibration files and distinguishes which LCU is being connected and sends the logged data to the preset download path.

The Channel Calibration editor CTRL+C simplifies creating and editing sensor calibrations.

A QwikData 2 Sensor Calibration Library is provided in the Calibration Editor Window containing calibrations for all QwikData 2 sensors. Just choose a sensor by part number and apply the calibration to the selected channel using the [Import Calibration](#) function.

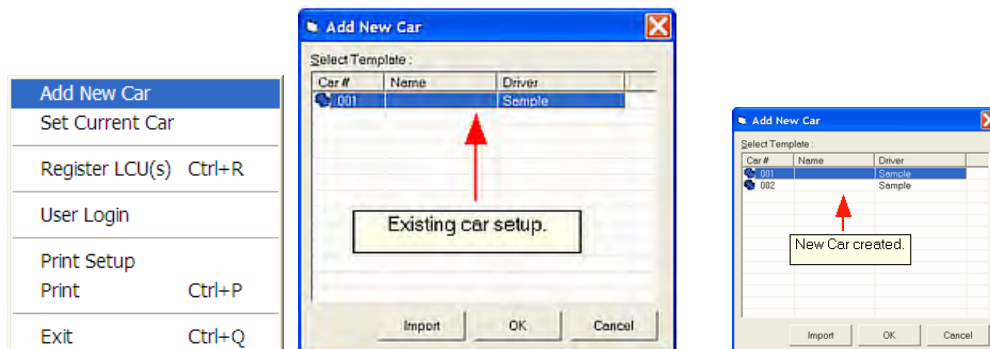
Using the copy/save calibrations functions allow user libraries to be created to back-up your different setups and calibrations.

File

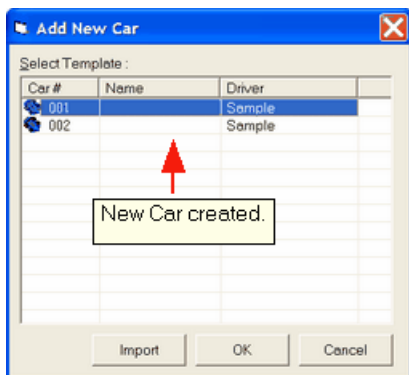
Add New Car

Use this function to create multiple car setups.(**Car ##**). Highlite the existing setup to use as a template or choose import from a previously saved setup.

1. On the Menu Bar under **File** select **Add New Car**.



2. Select a template from one of the existing car setups. For initial setup highlight Setup #001.
3. Press **OK** to create a new car setup.



The new car will be created and automatically be added to the next empty position in the setup folder.

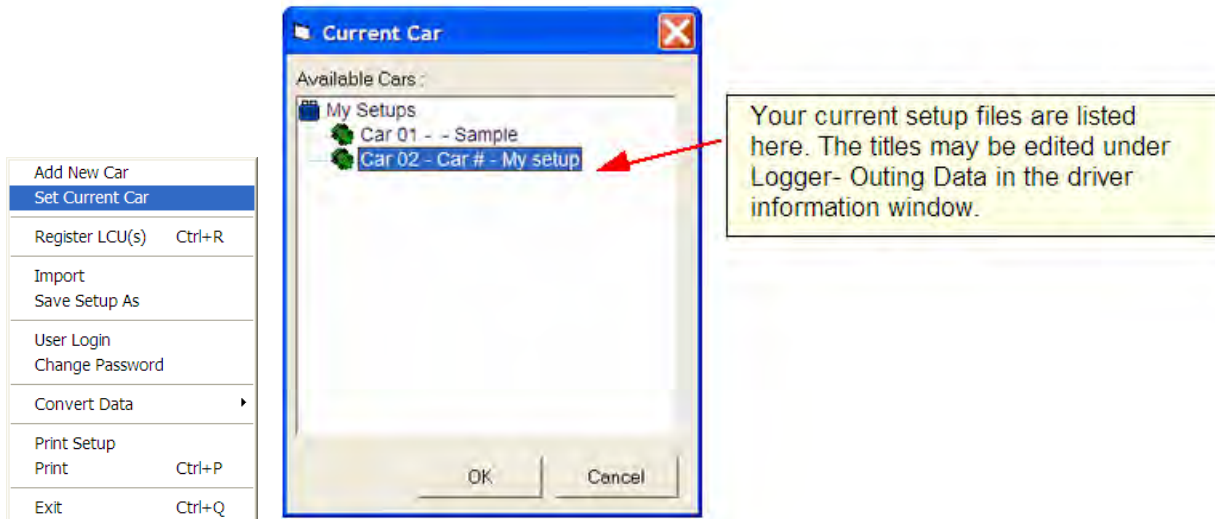
Notes

- Use the Import button to select from a list of saved setup (*.STP) files.
- Up to ten different setups can be created.

Set Current Car

Set Current Car opens a specific Setup file for editing.


1. On the Menu Bar under **File** select **Set Current Car**.



2. Highlight a setup in the current car window for editing.

3. Press **OK**.

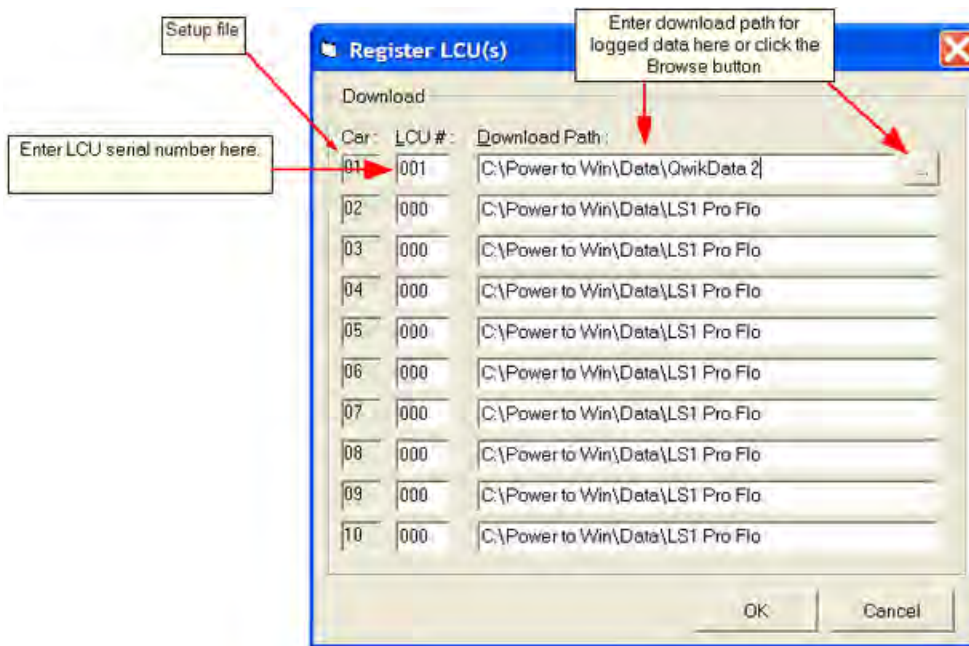
Notes:

- Before the new Setup can be loaded in the LCU you must Register the LCU and Download Path with the new Car Setup # in [Register LCU](#).
- You can also change the current car by using drop down combo box at the top of the setup folder. 

Register LCU

In order for the LCU to recognize a specific setup file (**CAR ##**), the LCU serial number must be registered and a download path must be specified for LCU logger data that will be downloaded automatically to this user defined location on your computer. The serial number can be found on a sticker on the housing of the LCU and also appears on the status bar of the USB Comms screen of your computer when connected.

1. On the Menu Bar under **File**, click **Register LCU's**.



2. Enter the LCU serial number and logger download path next to the **Car** setup you are working with.

3. You can browse for a download path by clicking the [...] button.

Select the new path or enter the name in the path text box. If the download path does not exist you will be prompted to have it created for you.

4. Click **OK** to save changes.

Notes

- Create recognizable file names like Car description or event name eg: C:\Power to Win\Data**Mustang** or C:\Power to Win\Data**Raceway Park**
- Unused serial number fields should be set to zero.
- Data downloaded from an unregistered LCU will default to position one.

Logger

The data recorded into the QwikData 2 Logger is downloaded to a PC, either each time the vehicle comes into the pits or at the end of a race, or test session.

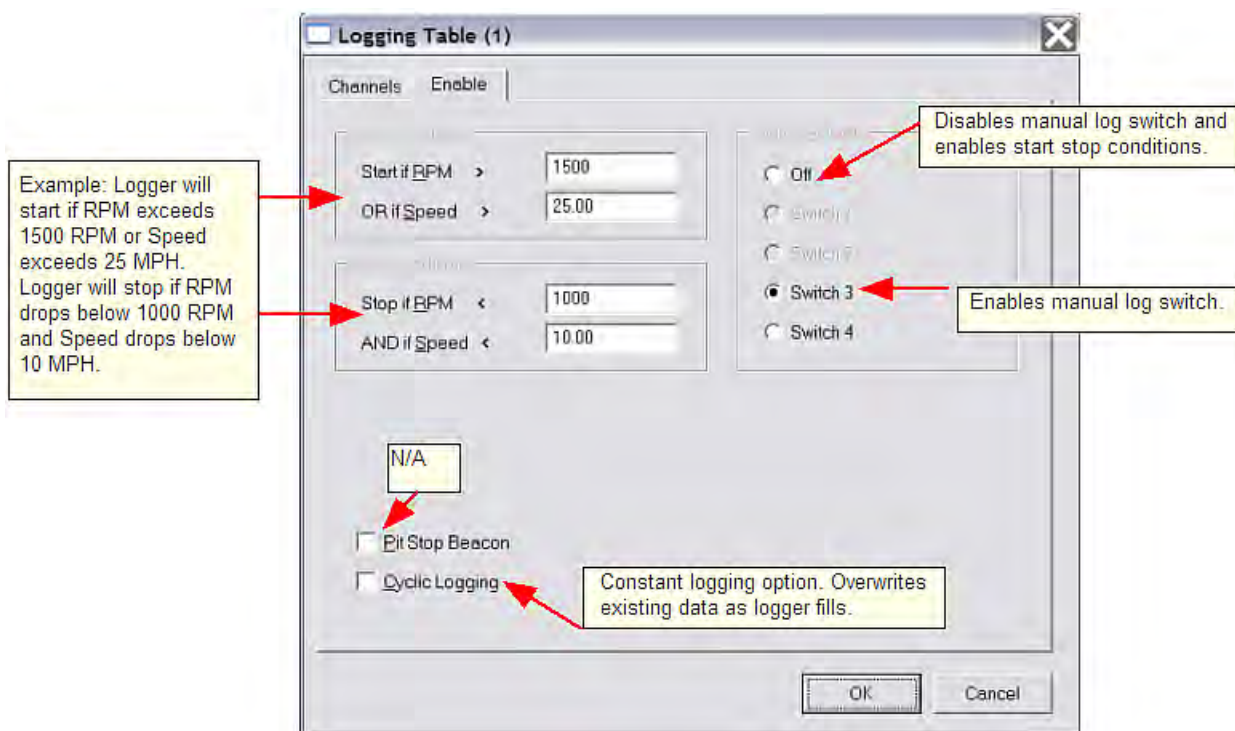
A logging table window enables the user to select channels for logging and set individual channel sample rates. Data sample rates are adjustable per channel from 1 to 1000 samples per second. The logger frequency rate that a channel is sampled should depend on the channel parameter being measured. For example, engine coolant temperature changes slowly so it can be logged slow at 1Hz (1 time a second), whereas engine RPM or wheel speed changes very quickly and needs to be logged faster at 20–50 Hz (20–50 times per second). If the coolant temperature is logged at 20 Hz it will waste logging memory; and if RPM is logged at only 1 Hz it will not be useful as a lot of detail is missing. The current log time available and logger memory is displayed on the right in the logger table. Available log time adjust as sample rate are adjusted and channels are selected. QwikData 2 Basic comes equipped with 1 Meg of memory. QwikData 2 Advanced comes equipped with 4 Meg of memory.

Logging Table Enable Conditions

Use this function to setup the enable conditions that define the logging start and stop criteria. Logging will start when either of the start conditions are met but will only stop when both stop conditions are met.

Your QwikData 2 harness is supplied with two leads labeled LOG-SW and SW-GND for a switch to manually start logging (Switch in closed position) and stop logging. Select **Switch 3** for manual switch override. The Start Stop Conditions have no effect when the Switch 3 is active.

1. On the menu bar under **Logger**, click **Logging Table**.
2. Click on the **Enable** tab.
3. Set the **Start** logging conditions or select Switch 3 for manual logging switch.
4. Set the **Stop** logging conditions



5. Click **OK** to accept the changes.

Notes

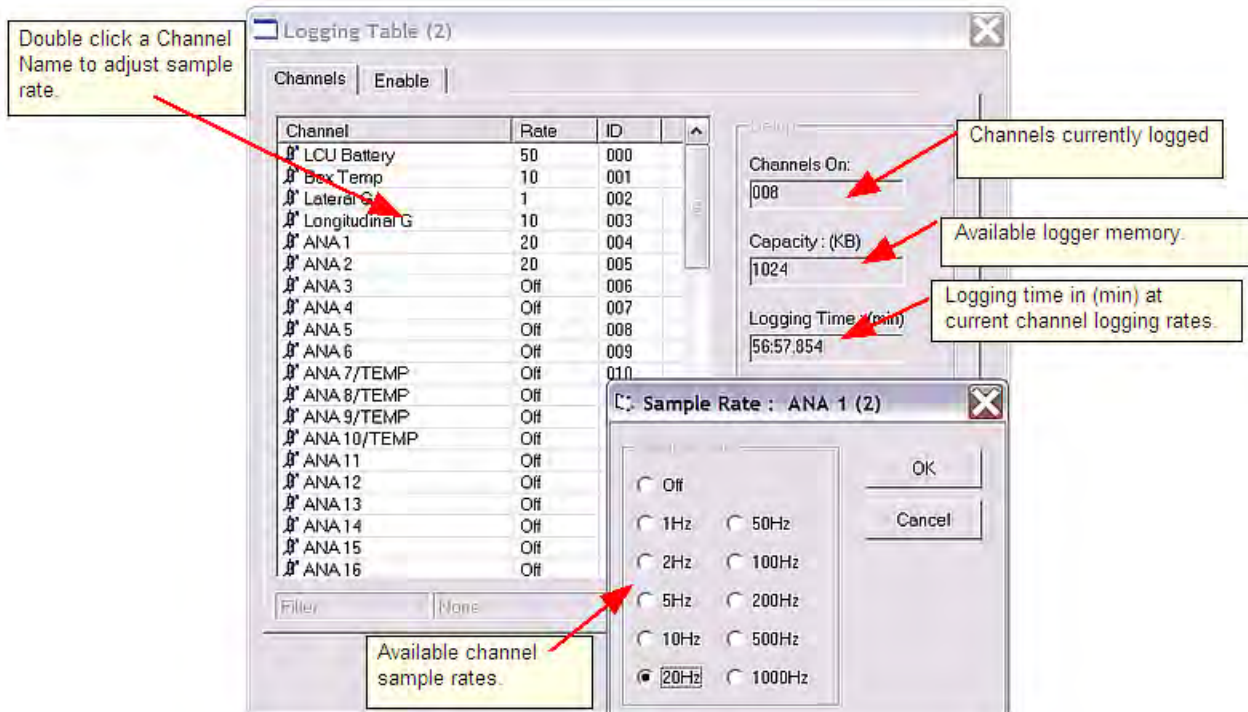
- **Cyclic Logging** is for continual logging after memory has filled, previously stored data will be overwritten.
- **Pit Stop Beacon** reserved for future software releases.

Logging Table Channel Setup

Use this function to setup the sample rates for each of the channels that you want to log.

1. On the menu bar under Logger, click Logging Table.

The available channels and current sample rates will be displayed.



2. Double-click on the channel you want to change the sample rate on.

3. Pick a new sample rate from the available options window.

4. Click **OK**.

The LCU has a fixed amount of logging memory and has a maximum through put of samples which dictates the logging rates for channels. If you choose to log channels at a high rate you will reduce the total number of channels that you can log. If a channel does not vary much during a lap, for example; temperatures, pressures then choose slower logging rates.

5. Repeat step 3 for the next channel.

6. Click **OK** to accept the changes.

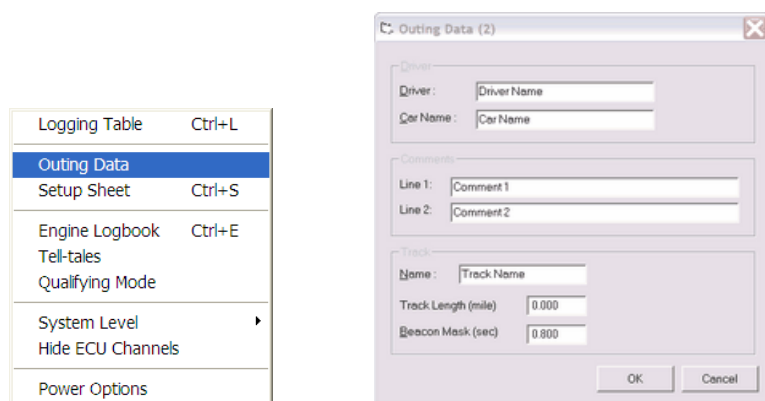
Notes

- The number of channels enabled and the total logging time is updated each time you make a change.
- Hold the Ctrl key and select multiple channels to change more than one channel at a time.
- The Channel Logging Rate of LCU Battery also controls the refresh rate of the Comms screen. It is recommended to keep this rate at 50Hz or Higher.

Outing data

This function allows the user to enter outing specific data that will be stored with each downloaded data set. This information also helps identify each logger outing when browsing for specific data files with the analysis program. It should be updated prior to each outing and can be edited in the Analysis program post downloads.

1. On the menu bar under **Logger**, click **Outing Data**.



2. Enter the **Driver** and **Car Names**.
3. Type in any text Comments for the data set in **Line 1** and **Line 2**.
4. Enter track Name and Length.

Beacon Mask is reserved for options in future software releases.

5. Click **OK** to save changes.

Notes

- The Outing Data is saved and will be downloaded as part of each Logger Data set and can be edited in the Analysis program.
- Beacon Option will be available at later time.

Setup Sheet

This function allows the user to enter vehicle and track specific setup data that will be stored with each downloaded data set.

1. On the Logger menu, click **Setup Sheet**.
2. Type in any text Comments for the data set.
3. Click **OK** to save or **Print** to print a hard copy.

Notes

The Setup Sheet is saved and will be downloaded as part of each logger data set.

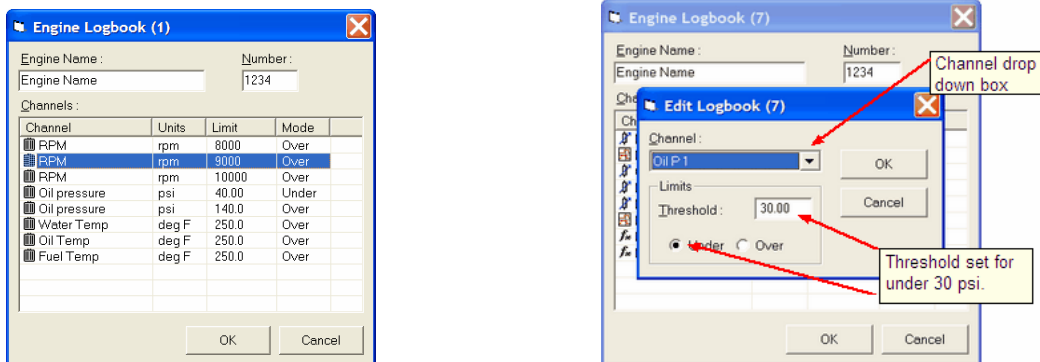
Engine Logbook

The engine logbook is a dedicated area of memory in the logger that records the performance and use of an engine. This function records the total time that a particular channel is above or below the defined threshold. This data is not reset but is accumulated between downloads and is saved as part of each data set.

In order for these to function correctly you must have one digital channel set to System RPM. For Digital channel set-up information refer to [Setup](#)

The logbook can only be reset using the Reset Logbook function in USB Comms and ideally should be reset after a engine change before you start the engine for the first time..

1. On the Menu Bar under Logger, click Engine Logbook.
2. Double-click on the channel threshold you want to edit.



The logbook channel editor window will open and display the current settings for the selected channel.

3. Select a channel from the drop down combo box.
4. Enter the active trigger threshold.
5. Select either the Under or Over mode.
6. Click OK.
7. Repeat step 2 for additional channels.
8. Click OK to save changes.

Notes

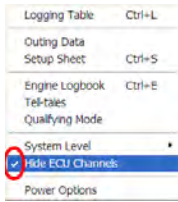
- An Engine name and Serial number can also be set in this window.

Hide ECU Channels

If you are using your logger without an ECU interface you can use the Hide ECU Channels menu option.

1. On the Menu Bar under **Logger**, select **Hide ECU Channels**.

A check mark will be placed next to the option indicating all ECU channels will be hidden in logger setup.



Channels

Channel Data

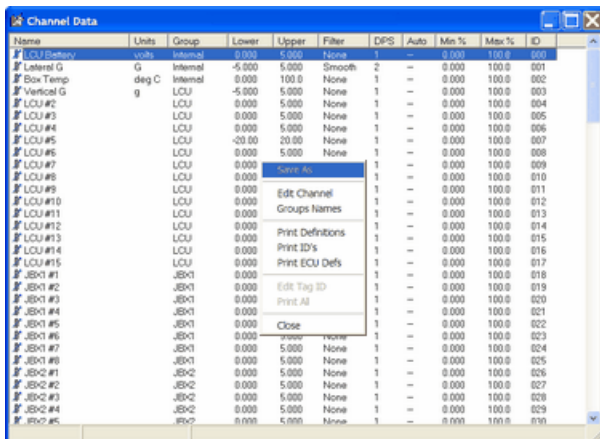
Channels

Use this function to view each of your global channel settings.

1. On the Menu Bar under **Channels**, click **Channel Data**.

The **Channel Data** window will open and display all available logger channels along with the parameters defined for each.

Double click a channel to display selected channels properties.



Options

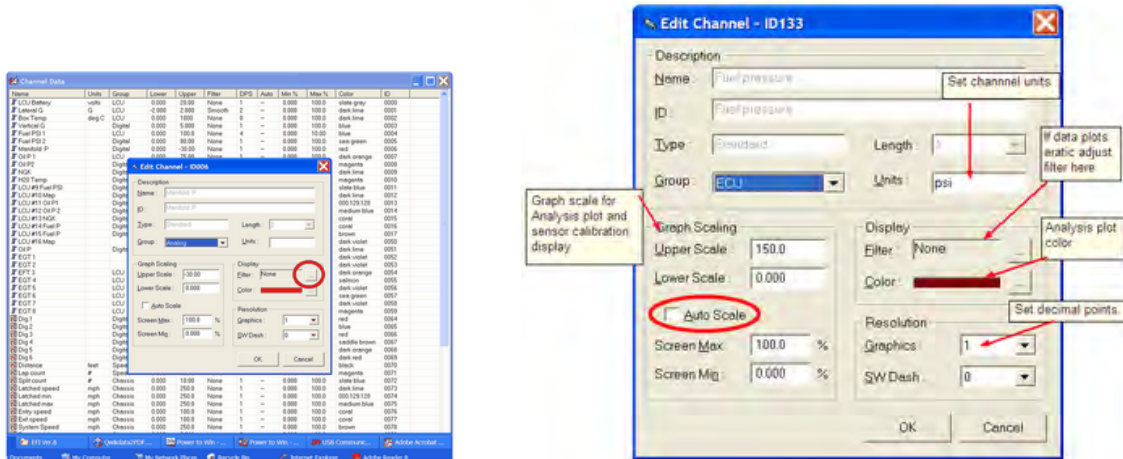
When you right-click over any of the channel definitions the popup menu with the following options will open.

- Edit Channel - Opens the channel edit window for selected channel.
- Group Names - Opens the window for editing your group names.
- Print Definitions - Print the definitions for all of your defined channels.
- Print ID's - Prints the channel ID's and types for your analog channels.
- Print ECU Def's - Print the definitions for your ECU channels.

Editing

Use this function to edit each channels global settings.

1. On the Menu Bar under **Channels**, click **Channel Data**.
2. Double-click on the channel you want to edit.



- You can edit any of the channel parameters except the **Name** and ID. Channel names can only be changed using Channel [Parameters](#) in the Calibration editor window.

3. Edit each of your channel settings.
4. Click **OK** to save changes.

Graph Scaling

- Upper Scale - Sets the upper scale for the graphic displays.
- Lower Scale - Sets the lower scale for the graphic displays.
- Auto Scale - Disables the upper and lower scales and forces the data to fit the window size.
- Screen Max - Sets the maximum % of screen used when Tile Graphs option is enabled.
- Screen Min - Sets the minimum screen % used when Tile Graphs option is enabled.

Display

- Filter - Opens the channel filter window.
- Color - Opens the color palette and sets the default channel color.

Resolution

- Graphics - Sets the number of decimal places for the graphic displays.
- SW Dash - Sets the number of decimals for the steering wheel dash.

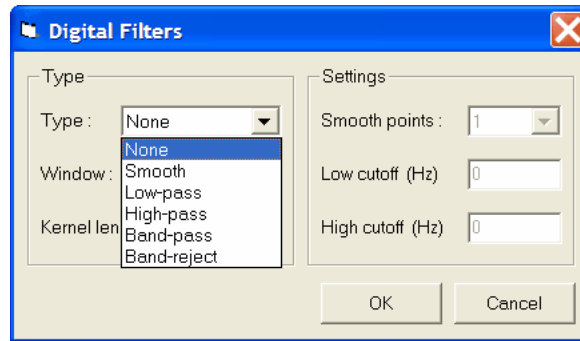
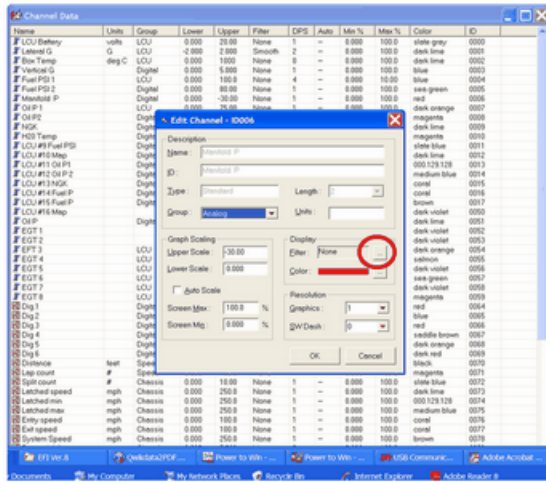
Notes

- The channel group can also be changed from this window.

Filters

Use this function to set the digital filters for each channel.

1. On the Menu Bar under **Channels**, click **Channel Data**.
2. Double-click on the channel you want to edit.
3. Select the **Filters** button.
4. Select the filter **Type** for the channel.
5. Set the different filter options.



6. Click **OK** to save changes.

Filter Types

- None
- Smooth - Averages the data using the number of **Smooth points** defined.
- Low pass - Allows a signal below a certain value and excludes all others.
- High pass - Allows a signal above a certain value and excludes all others.
- Band pass - Allows signals between two specific frequencies and excludes all others.
- Band reject - Rejects signal frequency within a specific band, while passing out-of-band signals.

Windows

- Hamming - Has 20% faster roll off
- Blackman - Has better stopband
- Raised Cosine
- Rectangular - No window

Notes

- A higher **Kernel length** means a sharper roll-off but longer calculation time.
- The number of smooth points only applies when using the smoothing type filter.

Creating (Edit) Calibrations

When calibrating a sensor you define a set of points by specifying x and y coordinates. A minimum of two points are required to create a linear calibration curve. Ideally the calibration should include two points close to the maximum and minimum raw values. Non-Linear type calibrations(Interpolation) for temperature sensors require more data points.

A pressure transducer may have a output signal range of .5 volts to 4.5 volts. The LCU converts this voltage to a Binary representation. QwikData 2 is a 12 bit system with a maximum resolution of 4096 counts(bits). At 0.0 psi the sensor output is .5 volts or 414 bits, at 100 psi the sensor output is 4.40 volts or 3605 bits. A sensor calibration refers to voltage output as X and the bit count as Y.

A complete understanding of Sensor Calibration is not necessary. The Import Sensor Calibration function is a simple direct procedure for calibrating most QwikData 2 sensors.

Three procedures for creating Sensor Calibrations are available in QwikData 2. Refer to the underlined links below for more information.

1. [Importing Calibrations](#). The simplest most direct procedure for creating sensor calibrations is to import calibrations from a list of sensors organized by part number and accessed with the Import function in the sensor calibration window.**(Microsoft Office Excel must be loaded on computer to function)**
2. [Calibrating in Manual ADC Count](#). Follow the Manual ADC Count procedure to manually enter the X and Y sensor calibration points from the keyboard for you sensors. This is a useful procedure if you are using a sensor supplied with specific calibration information.
3. [Calibrating from Sensor Output](#). If the output of the sensor is dependant on how it is installed, (a linear potentiometer used to measure damper movement or throttle position for example) then it is easier to use direct sensor readings from the logger for the X calibration point while communicating with the logger to calibrate the channel.

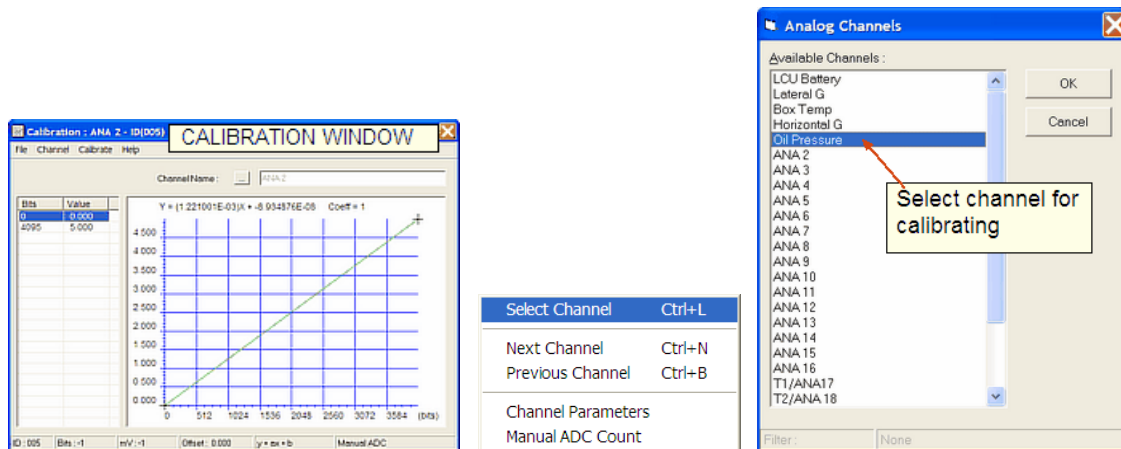
Notes

- It is helpful to first assign Channel names and setup graph scaling's in Channel Parameters for the channels you will be calibrating.
- Channel names must be entered under Channel Parameters in the Calibration Window. The Channel Scales, Color and Decimal Points may also be edited in the [Channel Data](#) Window.
- Microsoft Office Excel must be loaded in computer for Import Calibration Window to open properly.

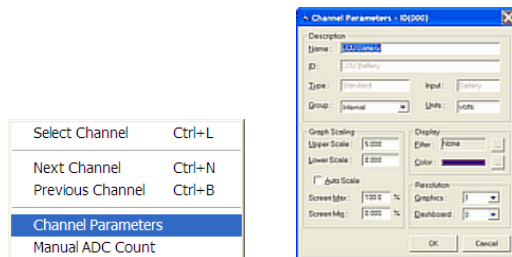
Channel Parameters

The first step in calibrating a channel is to set the channel parameters. Channel parameters are what defines a particular channel.

1. Under **Channels** on the menu bar select **Edit Calibration**, the Calibration Window will open.
2. From the Calibration Window menu bar under **Channel**, click **Select Channel** or **Ctrl L**. Choose the channel for calibrating from the list.



3. From the calibration window menu bar under Channel select **Channel Parameters**.
4. The channel parameter editor window will display the parameters for the selected channel..



5. Select **Name** and enter a name for the channel.
6. Select **Units** and enter the units that you want the sensor data displayed in.(psi ,inHg, Deg F. etc.)
7. Select **Graphics** and enter the number of decimal places to which the channel data is displayed.
8. **Auto Scale** sets the channels upper and lower graph scales automatically based on recorded data values.
9. Select **Color** and choose a default color for the channel from the defined palette.
10. Click **OK** to save changes. **Repeat steps 2 thru 10 for each sensor.**

Notes

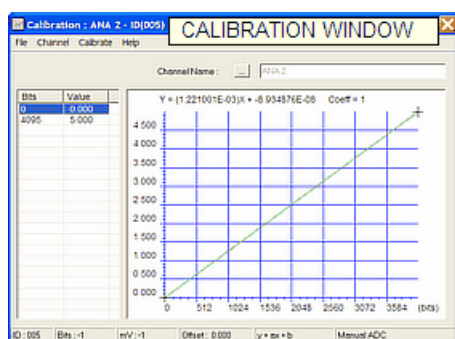
- It is recommended that the channel Filter parameter is set to none during calibration.
- Graph Scales will be applied to Calibration Window graph and Analysis Channel graph.
- Dashboard drop down feature is reserved for future software releases.

Importing Calibrations

Most users find this calibration procedure the simplest and most direct. Follow these functions to **Import** calibrations for your sensors. **Microsoft Office Excel must be loaded in computer.**

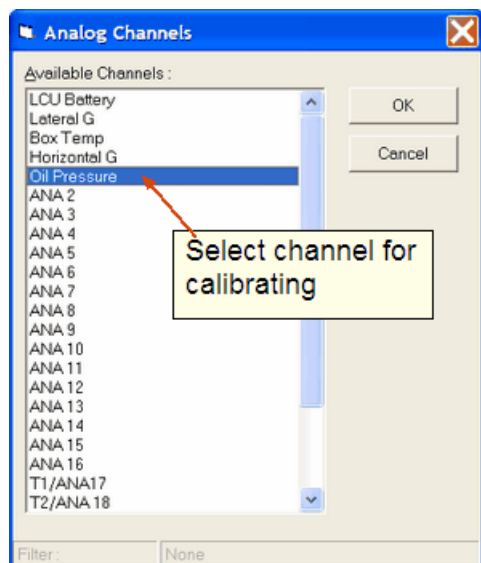
- Be sure to assign channel names and edit channel parameters before creating calibrations. (see [Parameters](#)). Un-named channels will be listed as LCU location or ANA##.

1. From the menu bar under Channels select **Edit Calibrations(Ctrl+C)**, this will open the calibration window.
2. In the calibration window menu bar under channel click **Select Channel**.



| | |
|--------------------|--------|
| Select Channel | Ctrl+L |
| Next Channel | Ctrl+N |
| Previous Channel | Ctrl+B |
| Channel Parameters | |
| Manual ADC Count | |

3. From the Analog Channels window double click the channel you want to calibrate.
4. From the menu bar under file select **Import**.

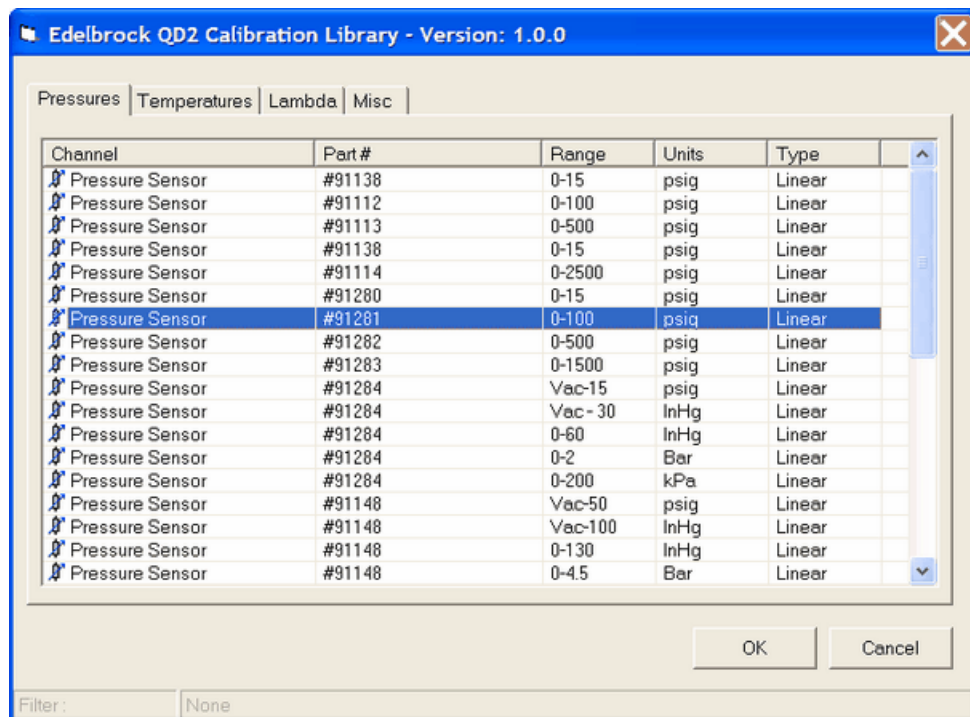


| | |
|-------------------|--------|
| Save Changes | Ctrl+S |
| Copy Calibration | Ctrl+C |
| Paste Calibration | Ctrl+V |
| Import ... | |
| Print Setup | |
| Print | Ctrl+P |
| Exit | Ctrl+X |

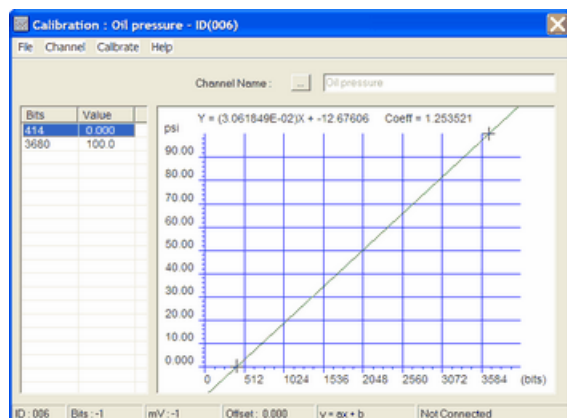
5. Select the tab to display the sensor type i.e: Pressure, Temperature, Lambda.

- Sensor calibrations are listed by part number or description and are available in various ranges and units.

6. Double Click on a sensor name to select.



- The calibration window will reopen with the selected calibration applied.



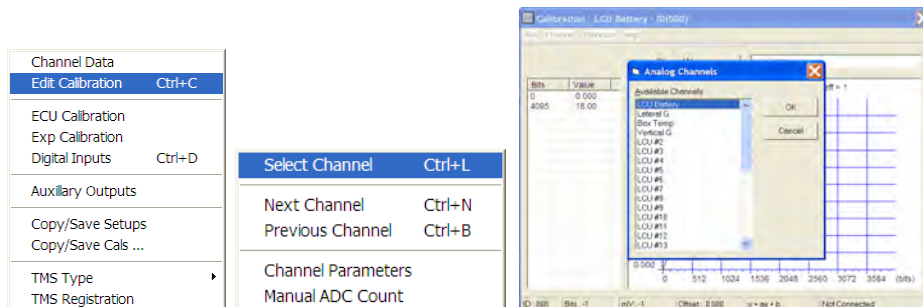
7. Repeat steps 2 thru 6 for next sensor.

8. To save changes exit Calibration Window or under File on the menu bar select **Save Changes**.

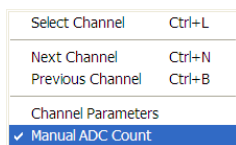
Calibrating in Manual ADC Count

Follow the Manual ADC Count procedure to manually enter calibration points from the keyboard for your sensors. This is a useful procedure if you are using a sensor supplied with specific calibration information. Be sure to edit the selected channels parameters before creating a calibration(see [Parameters](#)).

1. Open the calibration window and select the channel you want to calibrate.

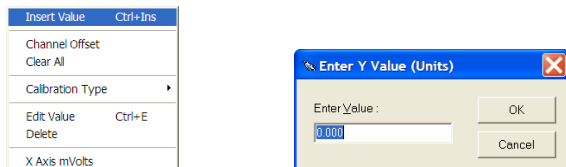


2. On the calibration window menu under **Channel** select **Manual ADC Count**, a check should appear.



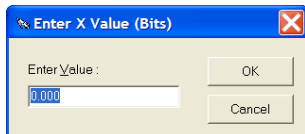
3. On the Calibration window Menu Bar under **Calibrate**, select **Insert Value**.

4. Enter the Y Value (Units)



Hit OK

5. Enter the X Value (Bits)



Hit OK

The graphic display is updated as points are added to the calibration grid. If calibration points exceed graph adjust graph scaling in step #7 of [Parameters](#).

6. Repeat step 2 to enter more calibration points if necessary.

7. Enter a [Calibration Type](#)

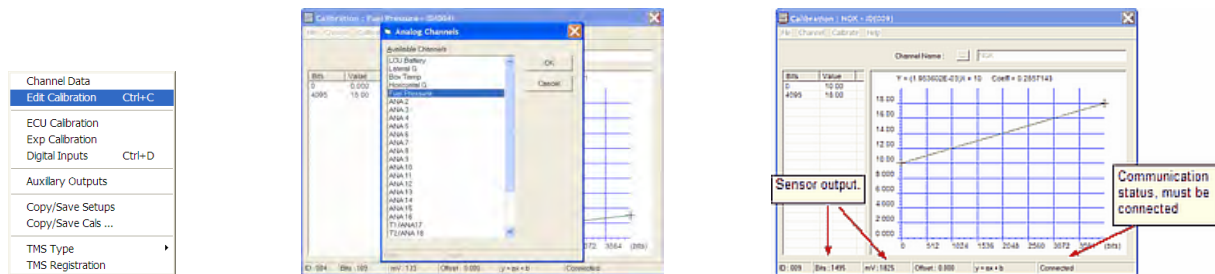
8. Close to save changes.

Calibrating from Sensor Output

If the output of a sensor is dependant on how it is installed; for example, a linear potentiometer used to measure damper movement or throttle position Calibrating from Sensor Output is very useful.

Calibrating using direct sensor readings requires USB comms to be open and online with the LCU and LCU 12 volt power ON. In the Calibration window under **Channel** the **Manual ADC Count** must also be unchecked. Be sure to edit the selected channels parameters before creating a calibration(see [Parameters](#)).

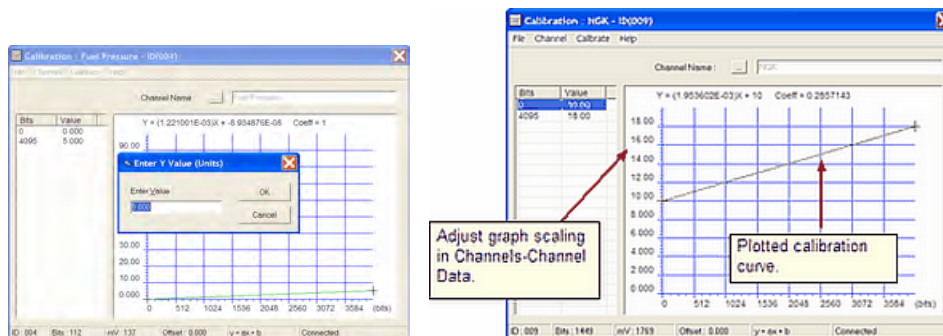
1. Open the Calibration window and select the channel for calibrating. If you are connected to your LCU the real-time channel reading in the status bar is active showing the current output from the selected sensor and can be used to monitor the response of the sensor as it moves. The lower right corner of the calibration window should read Connected. The calibration points in the grid are plotted on the graph.



2. Hit the Enter Key, a window for Y Value should open, set sensor to known value for Y, enter value of Y in the window and hit Enter Key again to record calibration point.

3. Repeat steps to record more calibration points.

4. Close window to save Calibration.



Notes

- You can use the **Del** key to delete unwanted calibrations points for the selected grid cell.
- Use the **Edit Value** menu to edit existing calibration points.
- The first four available channels on the channels list are LCU internal, the connection status will always read Not Connected for these channels.

Calibration Types

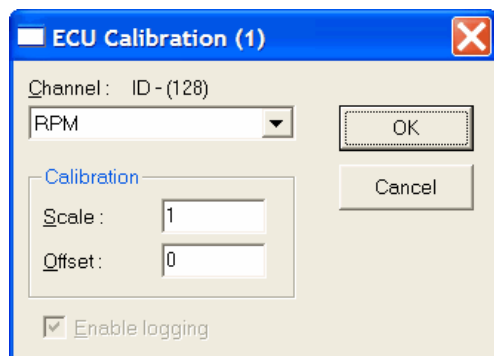
The calibration window allows five calibration curves that can be fitted to your points to define the response of the sensor over the entire measurement range. The calibration options are:

- **Linear** $y = ax + b$ **(Most sensors use this type)** Sensors such as displacement transducers or pressure sensors that are calibrated on the car. This type draws the best straight line through all of the points.
- **Interpolation** Mostly used for temp sensors or anything that is non linear or not able to be well defined by the other types.
- **Quadratic** $y = ax^2 + bx + c$ Any multi point calibration that can be curve fit to a quadratic type. RTDs and small range temps sensors.
- **Table with Hold** Gear position, clutch or nitrous switch calibration. System draws a step function to define the change points.
- **Scale & Offset** Any sensor that is supplied with simple scale and offset values for its calibration by the manufacture.

ECU Calibration

To view ECU channel data in engineering units it must be calibrated by applying a scale and offset to the raw data.

1. On the Channels menu, click **ECU Calibration**.



2. Select the channel you want to edit from the combo box.
3. Enter the calibration Scale value.
4. Enter the calibration Offset value.
5. Repeat step 2 for any additional channels.
6. Click **OK** to save changes.

Digital inputs

Digital channels (also referred to as Frequency) can be used to measure RPM, Speed, Frequency, Pulse Counts and Digital Events. The QwikData 2 Basic System has 1 Tach Input and 1 digital input. Harness connectors are labeled Tach Input and Freq. 2. The QwikData 2 Advanced system has 4 digital channel inputs. Harness connectors are labeled Tach Input, Freq. 2, 3, and 4. The Tach Input and Digital Inputs 2 thru 4 are hi speed digital input channels. Digital #5 - Pin 15 of the 34 pin Basic LCU connector and Digital #6 - pin 26 of the Advanced 26 pin connector can be wired to as low resolution digital inputs. This input acts as a counter each time a digital event occurs (the counter resets to zero each time the logger power is cycled). For information regarding Tach Input or Digital Speed Sensor connections to a digital channel refer to examples [Connecting a Tach Input](#), [Connecting a Digital Speed Sensor](#).

NOTE

- Reed Switch Speed Sensor #91116 purchased before Sept.09 require a .33uF capacitor be soldered across the signal and ground wires inside the Switchcraft sensor connector.

Digital Input Setup

Use this function to setup your LCU digital inputs as speed channels.

The logger references a System Speed input for both the logging criteria(*not necessary if activating logger with Switch Activate option*) and for the engine logbook. In order for these to function correctly you must have at least one digital channel set to **System Speed or System RPM**. If no digital RPM inputs are available for System RPM the logger must be enabled with a switch. See Logger [Enable Conditions](#).

1. Assign Channel name in **Name** window.
2. On the menu bar under **Channels**, click **Digital Inputs**.
3. Select a **Input Type** for Digital channel.

| ID | Name | Input Type | Teeth | Tire Dia. (in) | Trigger Edge |
|-------|-------------|------------|-------|----------------|--------------|
| ID64: | RPM | System RPM | 4 | | Rising |
| ID65: | Input Shaft | RPM | 1 | | Rising |
| ID66: | Speed | Speed | 6 | 31 | Rising |
| ID67: | Dig 4 | Reserved | | | Rising |
| ID68: | Dig 5 | Reserved | | | Rising |
| ID69: | Dig 6 | Reserved | | | Rising |

Buttons: System Speed, OK, Cancel

4. If connected to a tach output signal for engine RPM enter the number of pulses per engine revolution. If using a trigger wheel or flying magnet enter number of magnets or **Teeth** on trigger wheel. The logger calculates distance and speed from the number of pulses received from the wheelspeed sensors and the tire diameter of each wheel.
5. Select trigger edge for sensor signal. Most sensors trigger off rising edge. If data is inconsistent or has drift and pulses per rev are correct try changing Trigger Edge.
6. Click **OK** to save changes.
 - The **System Speed Button** allows users the option of combining two or more channels to create your System Speed channel.

1. Open the **Digital Inputs** setup and press the **System Speed** button.
2. Select the **Active Inputs** to be used.
3. Pick one of the **Mode** options.

Note: To set Properties for Digital Input Channels select channel from [Channel Data](#) Window.

- Reed Switch Speed Sensor #91116 purchased before Sept.09 require a .33uF capacitor be soldered across the signal and ground wires inside the Switchcraft sensor connector. Refer to [Connecting a Reed Switch Speed Sensor](#).

Auxiliary Outputs

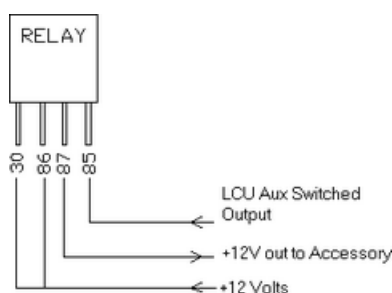
Auxiliary outputs are switched ground outputs controlled by the logger using Auxiliary Output channels 1 or 2 and a set of defined conditions for a specified logged channel.

Examples may be a dash lite activated by a channel programmed to alert a condition ie: RPM shift lite, low oil pressure warning, excessive fluid temperature, low or hi nitrous bottle pressure etc.

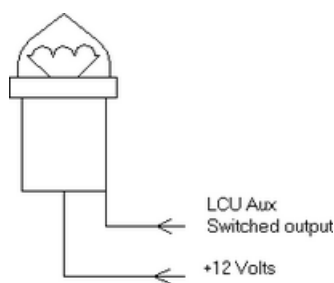
Auxiliary Output is rated at 1.5 AMP max. For triggers exceeding 1.5 AMP's output can be configured to activate a relay that controls another function ie: nitrous bottle heater or solenoid. When triggered the output from the harness will supply path to ground.

Auxiliary Output example diagrams

Relay Circuit



Warning Lamp Circuit



Note

- All Auxiliary outputs switch path to ground when activated.

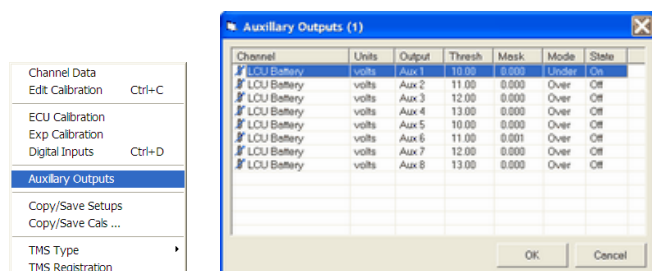
Channels

Use this function to view and edit each of your auxiliary output channel settings.

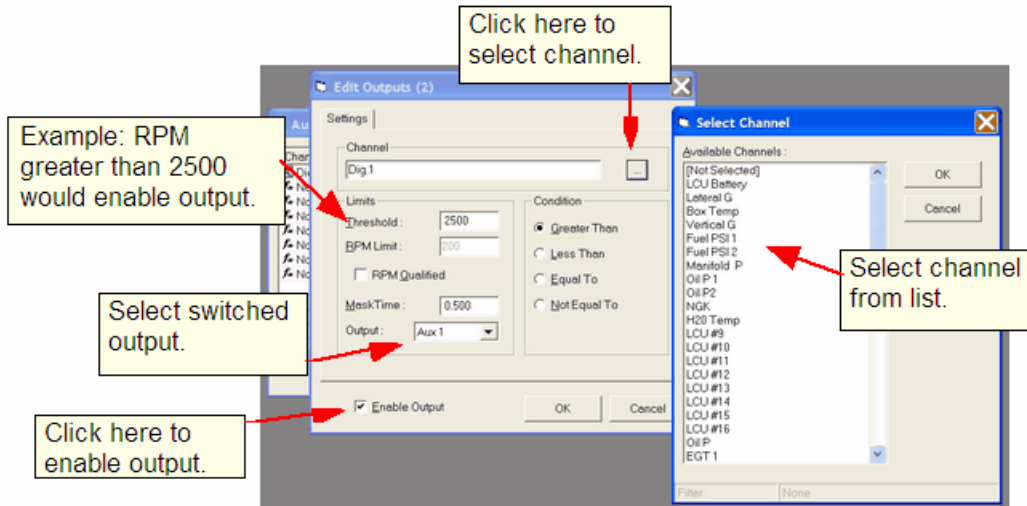
- In the **Channels** menu, click **Auxiliary Outputs**.

The setup window will open and display all of your auxiliary outputs along with the parameters defined for each.

Auxiliary outputs are switched outputs controlled by the logger using a channel and a set of defined conditions.



2. Double-click on a channel and the parameter edit window will open.
3. Select the channel you want to use and edit any of the channel enable conditions. Next click on the Enable Output check box.



4. Click OK.
5. Close the window to save your changes.

Notes

- When triggered the output from the harness will supply path to ground.
- It is recommended that any unused outputs are disabled.

Limits

- Threshold - Sets the activation value for the channel selected.
- RPM Limit - Sets the engine RPM threshold.
- RPM Qualified - Enables the RPM qualification feature.
- Mask Time - Sets the mask time before the output will activate.
- Output - Defines which output is to be controlled.

Condition

- Greater Than.
- Less Than.
- Equal To.
- Not Equal To.

Copy/Save Cals.

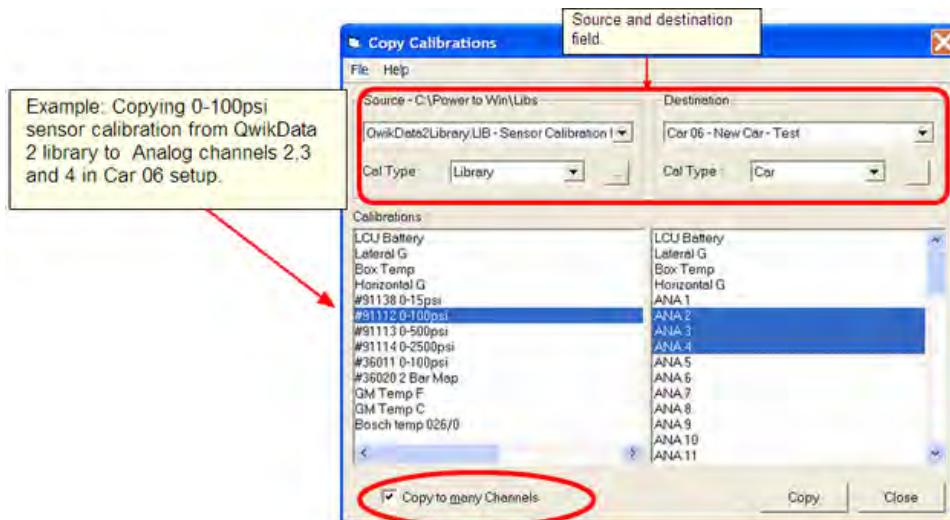
Use this function to copy your calibrations from a source to a destination. The source and destination can be either a car or a library. The ability to save and copy calibrations saves time when you change sensors between cars, correct mistakes or use different sensors for testing and competition. To create a New Library to back up your selected calibrations choose **New Library** under **File** on the Copy Calibrations Menu Bar.

1. From the Menu Bar under **Channels**, click **Copy/Save Cals**.

The Copy/Save window will open displaying the current settings for the source and destination fields and a list of your calibrations.

2. Check the **Copy to many Channels** check box.

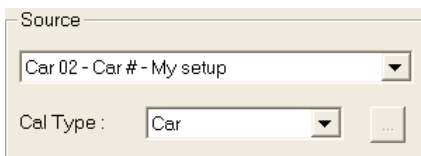
The calibration list window will now be split into two separate lists for the source and destination channels.



3. Select either a **Car** or **Library** from the **Source Cal Type**: combo box.




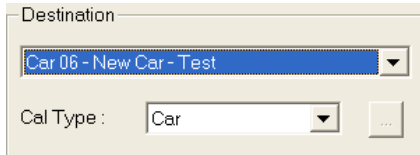
4. Select a calibration file (**Car ##**) or **Library** __.LIB with the **Source** combo box using the pull down ..



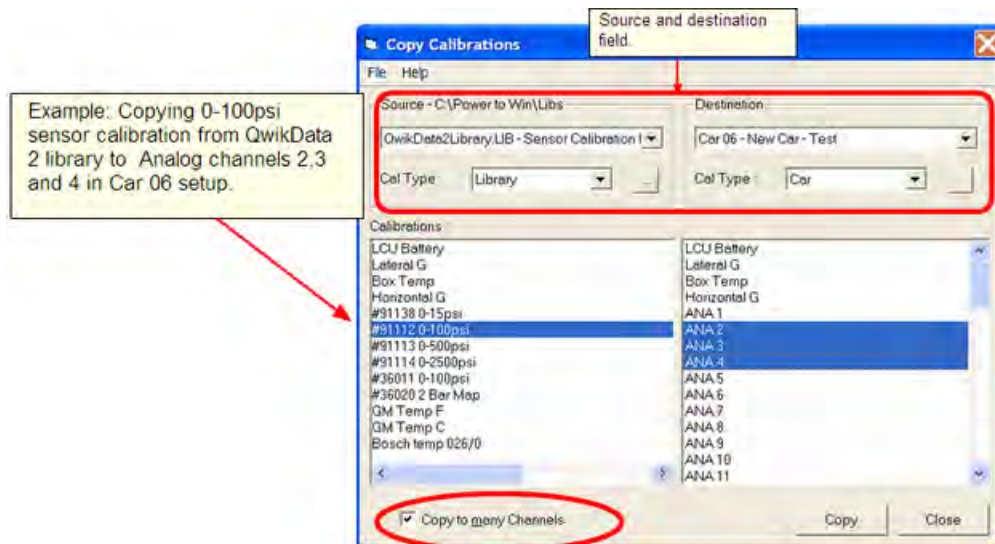
Each time you select a different source the calibration window will update showing each of the calibrations stored for your current selection.

5. Select either a **Car** or **Library** from the destination **Cal Type** combo box.

6. Select a calibration file (**Car##-**) or Library **__.LIB** with the **Destination** combo box using the pull down .



7. Select all of the calibrations that you want to copy in the calibration list on the source side of the window.



8. Choose the channels from the destination list that you want to apply your calibrations.

To choose a sequential group of items, select the first calibration item, hold down the **Shift** key and then select your last calibration item. All items between the first and last will be selected. To choose a discontinuous group of items, hold down the **Ctrl** key and select each item.

9. Click **Copy** to copy your calibrations.

Notes.

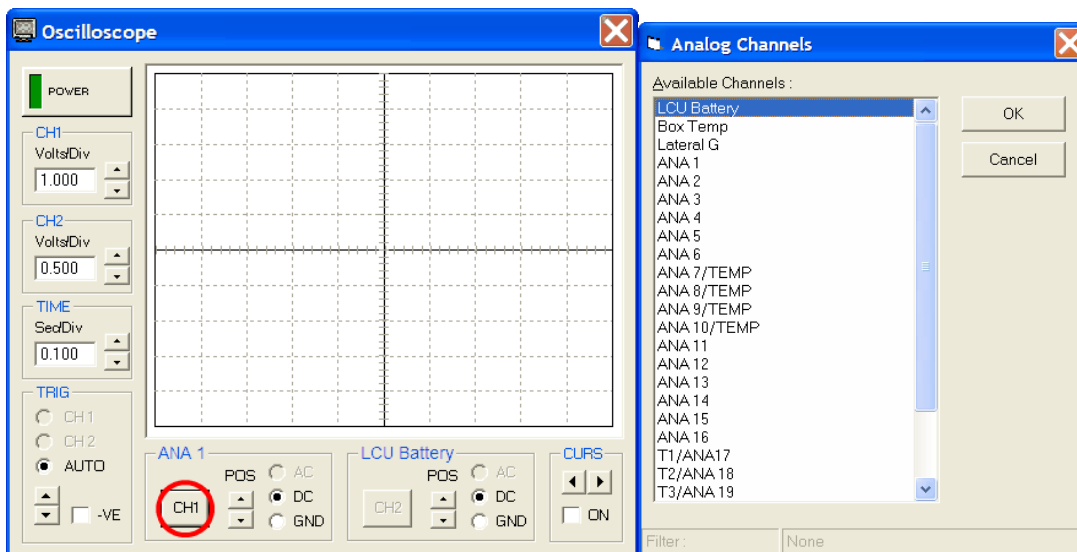
- You can browse for a new library path by clicking the [...] button.
- If not using the copy to many channels function or copying to a new library the copied calibrations will be placed in the same channel I.D location in the destination file as the source file. Channel I.D numbers are listed in [Channels](#) - **Channel Data** in the RH column.

Comms.

Oscilloscope

Use this function to open the real time oscilloscope display and monitor the input voltages for any of the logger analog channels.

1. Connect the USB Communication Cable to the LCU and power up the logger.
2. On the **Comms** menu, click **Oscilloscope**.













3. Click on the **CH1** button.
4. Pick a new channel from the available list.
5. Click **OK**.
6. The data for the new channel will display.

Notes

- You can set both the vertical scale (volts/div) and time base (sec/div) on the display.
- Click on the cursor checkbox to enable the numeric channel display.
- The 3 internal logger channels cannot be monitored by the oscilloscope function.

Configuration Icons & Hot Keys

| Hot key | Icon | Menu | Description |
|---------|---|-------------------|---|
| Ctrl+R |  | Register LCU's | Register the serial numbers for each of your LCU's. |
| Ctrl+P |  | Print | Print the setup for the current car. |
| Ctrl+Q | | Exit | Exit the program. |
| Ctrl+L |  | Logging Table | Open the logger channel setup window. |
| Ctrl+E | | Engine Logbook | Open the engine logbook window. |
| Ctrl+A | | System Alarms | Open the Alarm setup window. |
| Ctrl+C |  | Edit Calibrations | Open the analog channel calibration editor window. |
| Ctrl+D |  | Digital Inputs | Open the digital channel setup window. |
| |  | Set Current Car | Opens the Set Current Car window |
| Ctrl+S |  | Setup Sheet | Opens the Setup Sheet |
| |  | Outing Data | Opens Outing Data Sheet |
| |  | Channel Data | Opens Channel Data window |
| Ctrl+O |  | Oscilloscope | Open Oscilloscope window |

USB Communication

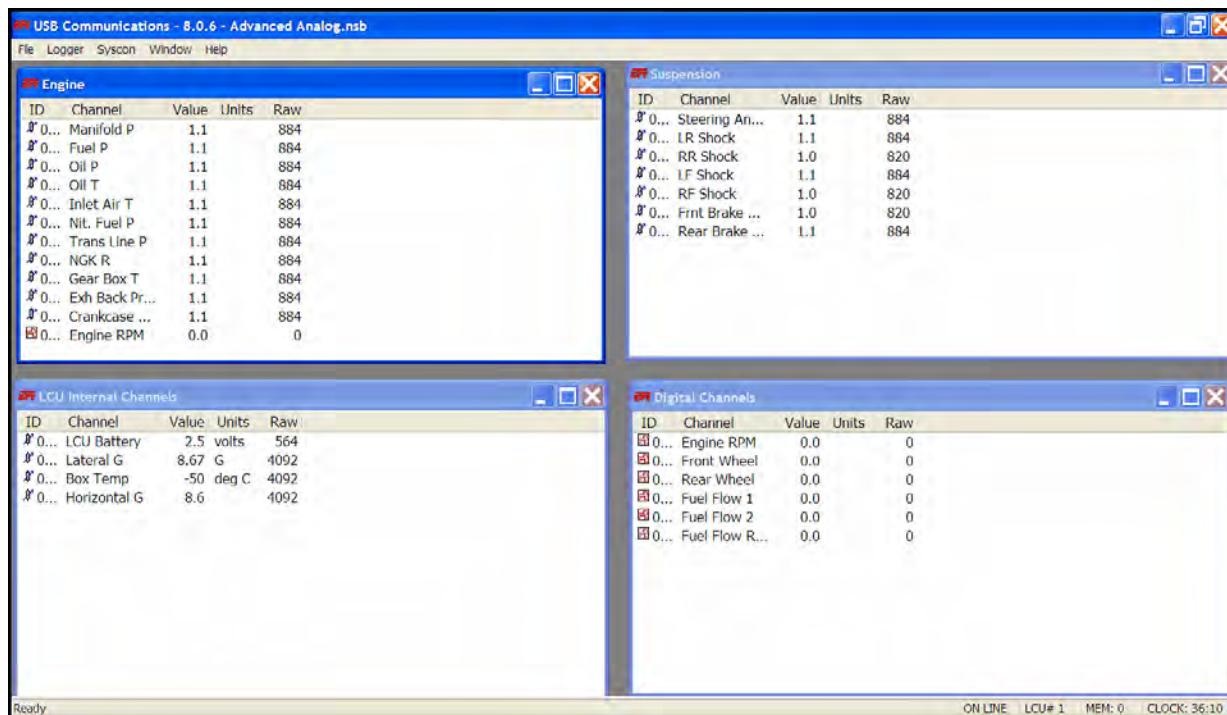


To open the Communication program from your desktop click the USB Comms Icon  on your desktop.

The USB Communications module is the main interface between your computer and LCU. It features an advanced user configurable window monitor along with tools for downloading data and sending setups.

The monitor allows the user to create any number of windows to display channel data. Once a screen format has been defined it can be saved to disk allowing multiple setups to be created and reloaded depending on the particular application.

A variety of functions are provided for setting up and downloading the data logger. New firmware can also be loaded from within this module.



Engine

| ID | Channel | Value | Units | Raw |
|--------|----------------|-------|-------|-----|
| # 0... | Manifold P | 1.1 | | 884 |
| # 0... | Fuel P | 1.1 | | 884 |
| # 0... | Oil P | 1.1 | | 884 |
| # 0... | Oil T | 1.1 | | 884 |
| # 0... | Inlet Air T | 1.1 | | 884 |
| # 0... | Nit. Fuel P | 1.1 | | 884 |
| # 0... | Trans Line P | 1.1 | | 884 |
| # 0... | NGK R | 1.1 | | 884 |
| # 0... | Gear Box T | 1.1 | | 884 |
| # 0... | Exh Back Pr... | 1.1 | | 884 |
| # 0... | Crankcase ... | 1.1 | | 884 |
| # 0... | Engine RPM | 0.0 | | 0 |

Suspension

| ID | Channel | Value | Units | Raw |
|--------|----------------|-------|-------|-----|
| # 0... | Steering An... | 1.1 | | 884 |
| # 0... | LR Shock | 1.1 | | 884 |
| # 0... | RR Shock | 1.0 | | 820 |
| # 0... | LF Shock | 1.1 | | 884 |
| # 0... | RF Shock | 1.0 | | 820 |
| # 0... | Frrt Brake ... | 1.0 | | 820 |
| # 0... | Rear Brake ... | 1.1 | | 884 |

LCU Internal Channels

| ID | Channel | Value | Units | Raw |
|--------|--------------|-------|-------|------|
| # 0... | LCU Battery | 2.5 | volts | 564 |
| # 0... | Lateral G | 8.67 | G | 4092 |
| # 0... | Box Temp | -50 | deg C | 4092 |
| # 0... | Horizontal G | 8.6 | | 4092 |

Digital Channels

| ID | Channel | Value | Units | Raw |
|--------|----------------|-------|-------|-----|
| # 0... | Engine RPM | 0.0 | | 0 |
| # 0... | Front Wheel | 0.0 | | 0 |
| # 0... | Rear Wheel | 0.0 | | 0 |
| # 0... | Fuel Flow 1 | 0.0 | | 0 |
| # 0... | Fuel Flow 2 | 0.0 | | 0 |
| # 0... | Fuel Flow R... | 0.0 | | 0 |

Ready ON LINE LCU# 1 MEM: 0 CLOCK: 36:10

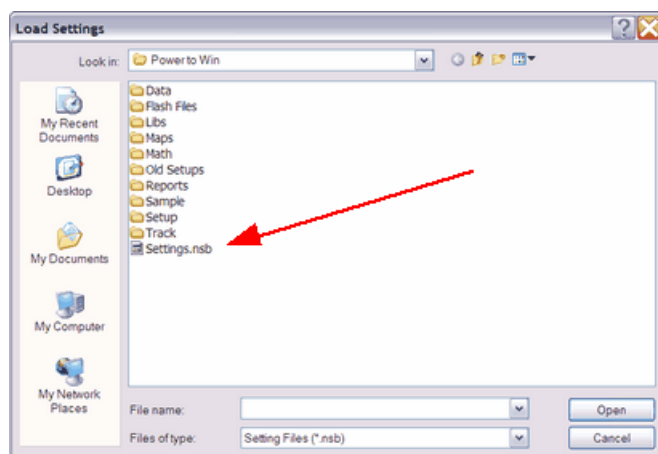
File

Opening a saved Template

- A Sample Comms screen is included in the software. From the menu bar select **File - Open** and select the **settings.nsb** file from the Power to Win directory. See [Editing windows](#) to further customize channel windows. When completed select **Save As** from the menu bar under **File** and assign new Comms Screen name.

Use this function to open a saved display template. Each of the display windows with its controls and loaded channels will be restored to the previously saved state.

1. On the Menu Bar under **File** click **Open**.
2. Select the drive and folder where the display setup is located. File type (*.nsb)
3. Double-click the display setup file or click **OK** to open it.



Notes

- A Sample Comms display screen is included in the software. **settings.nsb**

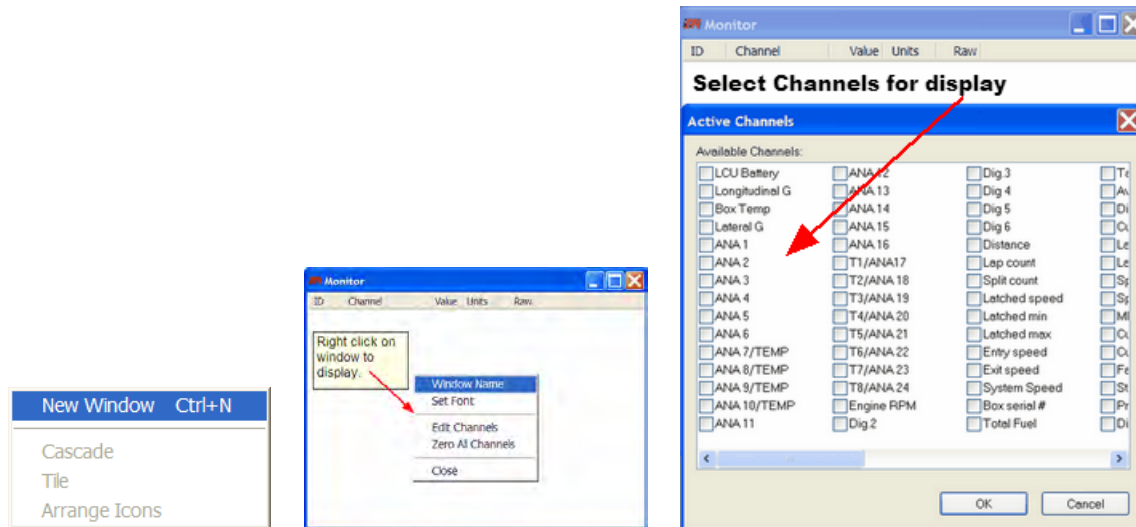
Creating New USB Windows

This function is used to create a new USB channel display window. Once created channels can be added to the window.

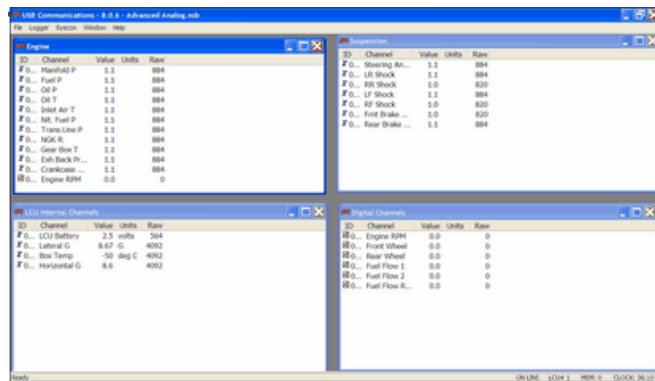
Open the Communications program and connect the USB cable between your laptop and LCU. Verify communication ON LINE in lower right corner of screen.

1. Under the **Window** menu, click **New Window**.
2. A blank new channel window will open.

- Right click anywhere on the new window to open window options.
- Assign **window name**, **set font** and **Edit Channels** for display. To display channels in window select **Edit Channels**.



- Select **tile** from window menu and repeat steps 1 and 2 to create multiple windows. It can be helpful to **group channels** and **tile windows** when monitoring several channels.



- Save Window Template [Saving a Template](#).

Notes

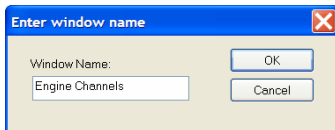
- Windows can be resized and moved by grabbing borders with mouse.
- See the section on [Editing windows](#) for further information about customizing your display.

Editing windows

Once a [New Window](#) has been created the channels displayed and the font can be edited. Right-click over the window and the popup menu with the following options will appear.

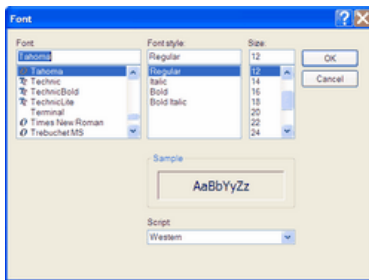
Window Name

This menu is used for editing the name of the current window.



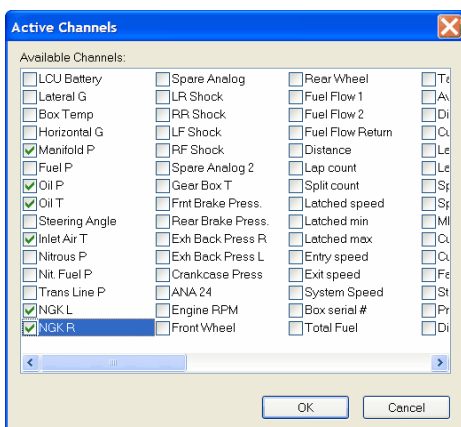
Set Font

This function is for changing the font type and size for the numeric display data.



Edit Channels

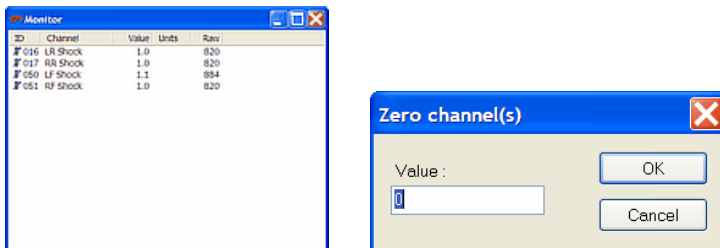
This function is for editing the channels displayed in the current window. A check by the channel name displays the channel.



- If changes are made to Channel Calibration Parameters in the Configuration program (Channel name or decimal point) USB Comms must be closed and re-opened or USB Cable removed momentarily for changes to take effect on Comms. screen.

Zero Channels

The Zero Channels function resets all the calibration offsets for the channels in the current window. This feature is most useful for accelerometers and sensors such as suspension travel sensors. Ex: The vehicle would be setup at its normal static ride height including full tanks and driver, then the suspension travel sensors would be zeroed. After being zeroed, the suspension travel values would be displayed as plus and minus values relative to static ride height. Zeroing pressure and temperature transducers is not recommended.

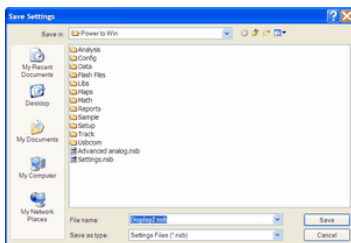


1. Right Click mouse over Channel Window containing channels for zero.
2. Select **Zero All Channels**.
3. Enter zero value and click **OK** to complete
 - You can also adjust channels individually by right clicking on a channel i.d number.
 - The Logger must be on and connected to the PC for this function to be active.

Saving a Template

Use this function to save the current screen setup.

1. On the Menu Bar under **File**, click **Save As**.
2. Select the drive and folder where you want to save your setup.
3. In the **File name** box, type a name for the setup.



4. Click **Save** to save changes.

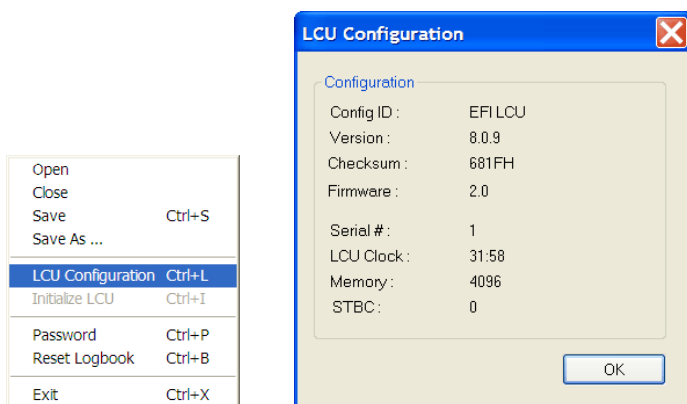
Notes

- Screen setup files are saved with file type (*.nsb) extension.
- You can use the **Save** menu item, to save using the existing name.

LCU Configuration

Use this function to display information about the LCU's current configuration.

1. On the **File** menu, click **LCU Configuration**.

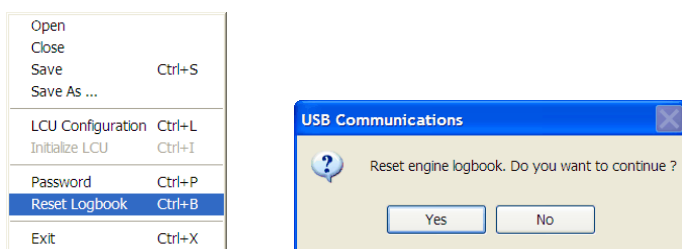


2. The Configuration window will be displayed.
3. Click **OK** to close the window.

Reset Engine Logbook

The logger continuously collects specific engine parameters as defined by the settings for your engine logbook setup. Use this function to reset the engine logbook data.

1. On the **File** menu, click **Reset Logbook**.
2. A dialog will appear to confirm you wish to continue.



3. Click **Yes** to reset the logbook.

Notes

- Once reset is selected all existing Engine Logbook data will be erased.
- Engine Logbook should be reset after each engine change.

Logger

Downloading Logged Data

Use this function to download data from your logger to your laptop. Once downloaded the data can be viewed with the Analysis module.

Open the Communications program and connect the USB cable between your laptop and LCU. Verify communication ON LINE in lower right corner of screen.

Open USB Comms program.

1. On the **Logger** menu, click **Download**.

| | |
|-------------------|--------|
| Download | Ctrl+D |
| Stop Download | |
| Auto Download | Ctrl+A |
| Send Config | Ctrl+C |
| Extract Setup | |
| Session Data | Ctrl+E |
| Preserve QMT data | |

A progress bar will briefly display indicating download progress.

After the download is complete the setup is automatically re-loaded.

Notes

- You cannot download the logger while it is still recording data.
- If Logger is empty a window indicating LCU has no data to download will display.
- See the section on [Register LCU](#) in Configuration for information on specifying download paths for your logger data.

Stop Download

Once the download routine has started you can interrupt the process using this function.

1. On the **Logger** menu, click **Stop Download**.

| | |
|-------------------|--------|
| Download | Ctrl+D |
| Stop Download | |
| Auto Download | Ctrl+A |
| Send Config | Ctrl+C |
| Extract Setup | |
| Session Data | Ctrl+E |
| Preserve QMT data | |

2. A dialog box will appear with options on resetting the logger.

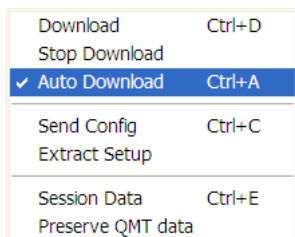
Notes

- Press Yes to reset the logger and exit. Any recorded data will be lost.
- Press No to exit without resetting. Any further logging will continue from where it last stopped.
- Press Cancel to continue downloading.

Auto Download

When this feature is enabled the logger will automatically start the download process when a valid USB cable connection to a computer is detected.

1. On the **Logger** menu, click **Auto Download**.



A check mark indicates the **Auto Download** feature is now enabled.

2. Click **Auto Download** again to disable this feature.

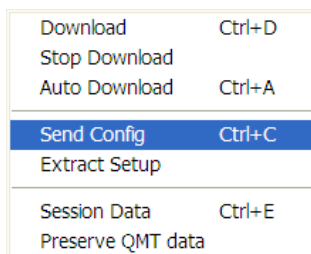
Notes

- You cannot download the internal logger while it is still recording data.
- See the section on [Register LCU](#) in Configuration for information on specifying download paths for your logger data.

Send Config

When you have made changes to your car setup in [Configuration](#) use this function to send a new Setup file to the logger. The memory buffer will be cleared and any existing data will be overwritten and lost.

1. On the **Logger** menu, click **Send Config**.



- The current setup registered to the LCU will be sent to the logger.

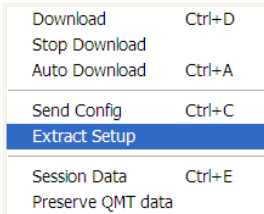
Notes

- You cannot send a new setup to the logger while it is recording data.

Extract Setup

The extract setup feature is a standalone function used to retrieve an unknown setup from the logger. If necessary you can import this file into configuration and overwrite the current car setup.

1. On the **Logger** menu, click **Extract Setup**.

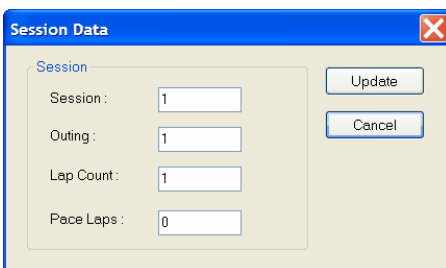


- The Extracted file is saved and named **extract.stp** with the setup files. To access this file use the **Add New Car** function in the Configuration module, choose **Import** and double click the **extract.stp** file. The extracted setup has now been added to your setup folder list as the next available car.

Session Data

Use this function to change the session data for subsequent data sets. Setting these values helps to identify specific data sets later on when using the Analysis module.

1. On the **Logger** menu, click **Session Data**.
2. The session data edit window will open.



3. Enter the **Session**, **Outing**, **Out Lap** and **Pace Lap** numbers.
4. Click **Update** to save changes.

Notes

- The lap counter will automatically increment after receiving a beacon signal. (Beacon transmitter necessary)
- The outing counter increments after each data set is downloaded.
- Session data can also be edited after the logger has been downloaded to disk from within the Analysis module.

Syscon

Load Hex File

Sometimes Firmware updates may be necessary. Use this function for loading a new version of firmware into a LCU.

Warning : Failure to load the correct version of firmware into an LCU may result in loss of functionality and/or non operation. In some cases the LCU may have to be returned to the factory for repair. Contact your Edelbrock representative for further information about loading firmware.

1. On the **Syscon** menu, click **Load Hex File**.

| | |
|---------------------|--------|
| Load Hex File | Ctrl+H |
| Read Hex File | |
| Read/Write Data | |
| Refresh Calibration | Ctrl+R |
| Protect Data | |
| Start Logger | Ctrl+M |

2. Select the drive and folder where the file is located.

3. Double-click the hex file or click **OK** to select it.

A progress bar will display during the programming routine.

Notes

- After loading a hex file the LCU must be powered down and restarted before it will function.
- Only hex files of the type (*.HEX) can be programmed into the LCU.

Refresh Calibration

Refresh Calibration updates the data on the USB Comms window as changes are made to calibrations in the configuration program without having to re-open USB Comms.

Example:

If Channel Calibration's are not displayed correct on the USB Comms Windows open the Configuration program, correct sensor calibration, change back to USB Comms and select **Syscon- Refresh Calibration**. The channel calibration will be refreshed and should read correctly reflecting the changes you made in Configuration.

| | |
|---------------------|--------|
| Load Hex File | Ctrl+H |
| Read Hex File | |
| Read/Write Data | |
| Refresh Calibration | Ctrl+R |
| Protect Data | |
| Start Logger | Ctrl+M |

Protect Data

When this feature is enabled the logger data buffer is preserved after a download. Any subsequent logging will continue from where it last stopped.

1. On the **Syscon** menu, click **Protect Data**.
2. A check mark indicates the protect data feature is now enabled.
3. Click on the menu again to disable this feature.

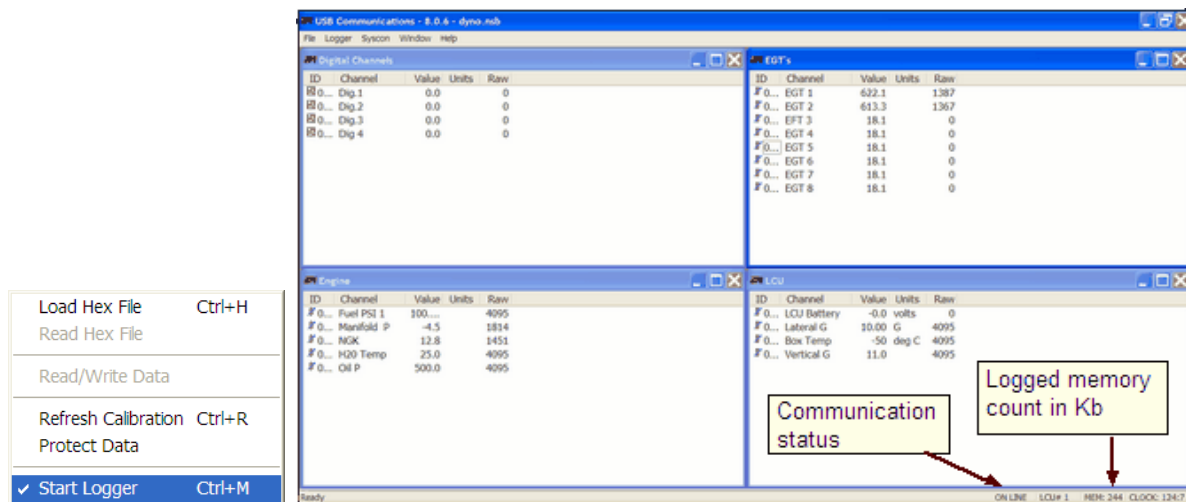
Start Logger

Use this option to manually start logging data while monitoring channels in the USB COMMS module. It is helpful for verifying logger download paths and setups prior to a outing.

NOTE: Start Logger option will not function if Switch 3 (manual logging switch) is active in logger start stop setup. Use manual logging switch to enable logger.

1. On the Syscon menu, click **Start Logger**.

The MEM: ### counter in lower right of screen should start counting up.



- Manual Logging stops by repeating step 1.

Data Analysis

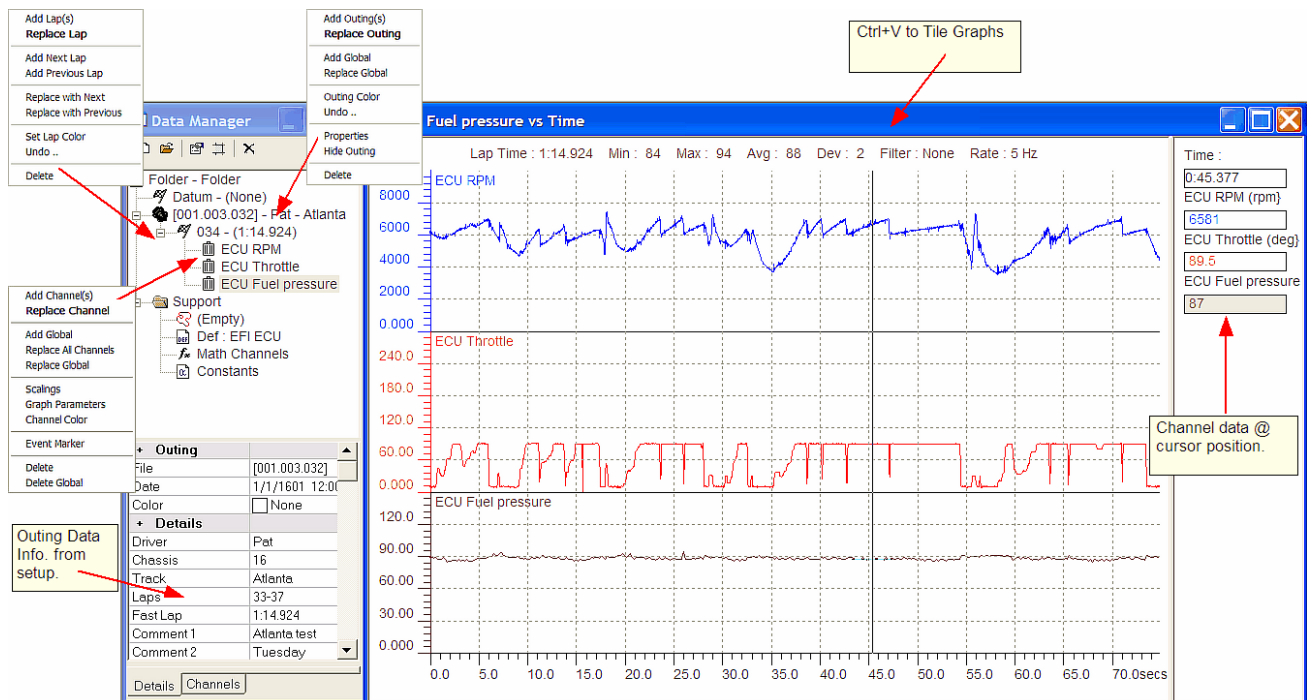


Open the Data Analysis program by double clicking the Data Analysis Icon on your desktop.

The Data Analysis module is a powerful tool designed to let you view and manipulate information collected from your data logger. Using the software you are better equipped to make informed decisions about your race setup and make changes to improve vehicle performance.


More detailed analysis may be achieved by combining data from sensors, mathematical equations, setup information and knowledge of race engineering. However you use the information, this tool helps you decide on what changes to make according to your interpretation of the data.


If you are going to make informed decisions then you must have confidence in your data. This can be achieved by making sure that you have good quality data and that you are looking at and interpreting the data in the right way.

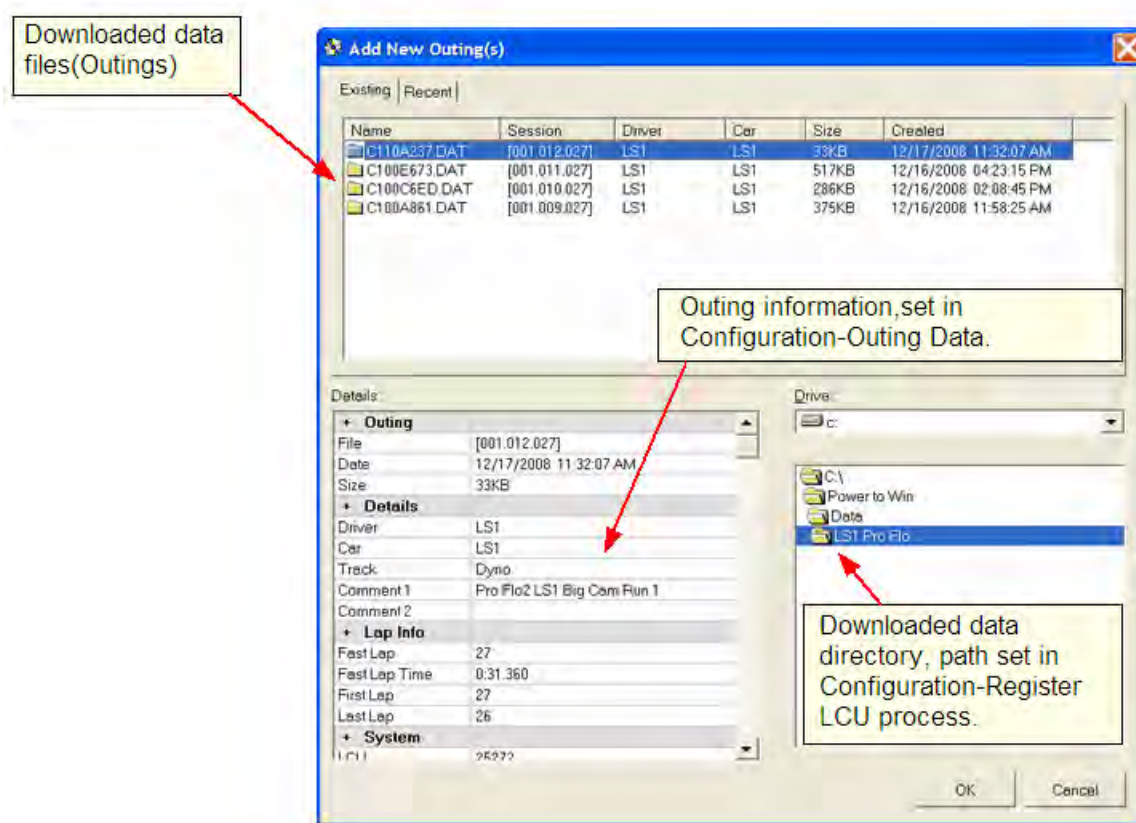


File

Add New Outing

 Use this function to add a downloaded data file to the Data Manager. Downloaded data files are referred to as Outings.

1. On the Menu Bar under **File**, click **Add Outing**. Or click Icon on menu bar .
2. Select the drive and folder where the Outing is located. Downloaded Data File location was designated when you registered your LCU and set the download path in the [Configuration](#) utility [Register LCU](#).
3. Click on the outing to read the file details and comments.
4. Double-click the outing or click **OK** to open it.



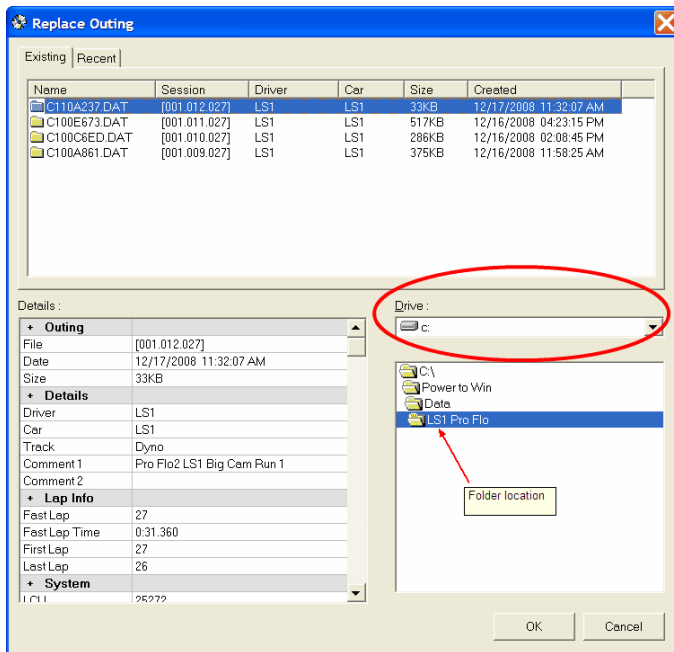
Notes

- To open a file you've used recently, you can use the **Recent File** menu list.
- You can use the **Replace Outing** menu to replace the current outing.
- Only outing files of the type (*.DAT) can be read by Analysis.
- Analysis can be set to automatically open the last downloaded data file. For details see [Auto Update](#).

Replace Outing

Use this function to replace the current Outing in the File Folder.

1. On the Menu Bar under **File**, click **Replace Outing**.
2. Select the drive and folder where the new Outing is located.
3. Click on the Outing to read the file details and comments.



4. Double-click the Outing or click **OK** to select it.

Notes

- To open a file you've used recently, you can use the **Recent File** menu list.
- You can use the **Add Outing** menu to add a new outing to the File Folder.

User Login

Certain features of QwikData 2 are password protected. This window is used when Edelbrock personnel need to login and activate these features.

Print

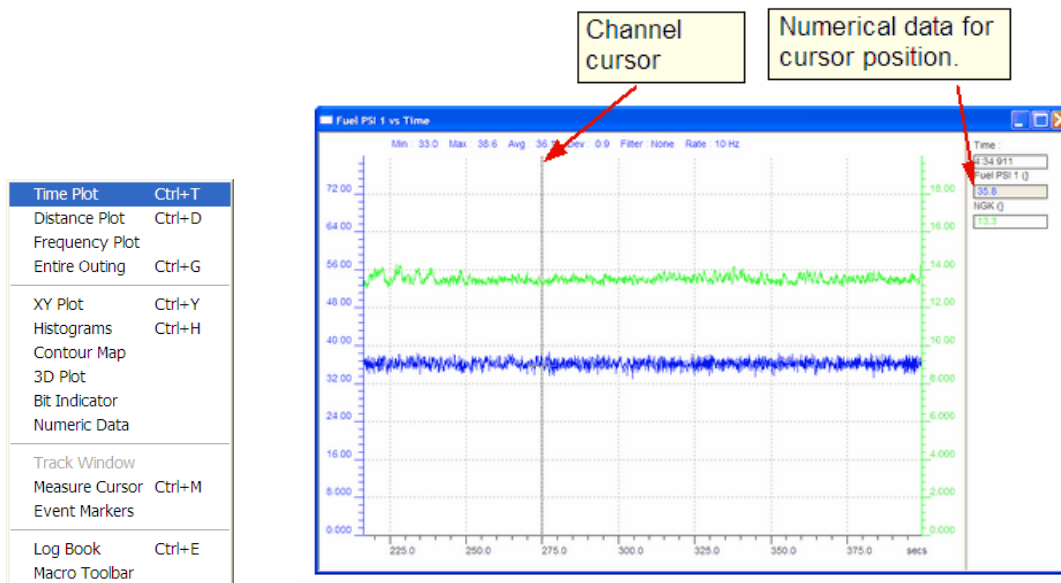
Use this to print a hard copy of the current window.

View


Time Plot

Use this function to open the time plot window. This plot is useful for looking at events that are independent of the position of the track or when a wheelspeed input is not available to plot against distance. Selected data should display.

1. On the Menu Bar under **View**, click **Time Plot**.



The time plot window will open and display a graph of the channels loaded in the file folder plotted against time. The scale for the current channel is displayed on the left axis and additional channel information is displayed at the top of the graph.

Select the Add Channels Icon  from the menu bar to display a list of logged channels to display on the graph.

2. Move the cursor horizontally to a point of interest.
3. Right click to open the zoom and scroll popup menu.

The channel numerical data for the current time will update as the cursor is moved. If the track map is open the current position will also update.

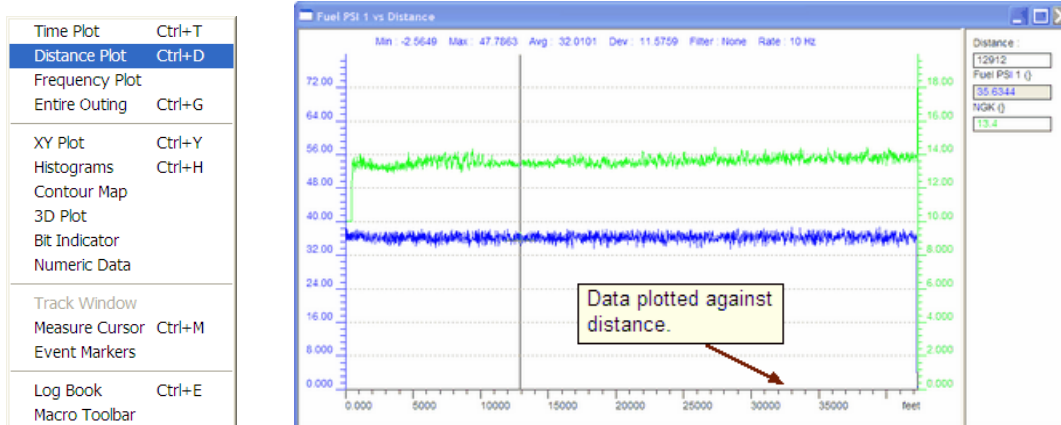
Notes

- Clicking on a channel in the file folder makes it the new current channel.
- Right click over the left axis to open the channel scaling popup menu.


Distance Plot

Use this function to open the distance plot window. This plot is useful for looking at events that relate to actual track position. Using the track window in conjunction with the distance plot gives an immediate indication of position on the track. By overlaying data from several laps you can compare visually the difference in performance at any point on the track.

1. On the Menu Bar under **View**, click **Distance Plot**.



The distance plot window will open and display a graph of the channels loaded in the file folder plotted against distance. The scale for the current channel is displayed on the left axis and additional channel information is displayed at the top of the graph.

Select the Add Channels Icon  from the menu bar to display a list of logged channels to display on the graph.

2. Move the cursor horizontally to a point of interest.

3. Right click to open the zoom and scroll popup menu.

The channel numerical data for the current distance will update as the cursor is moved. If the track map is open the current position will also update.

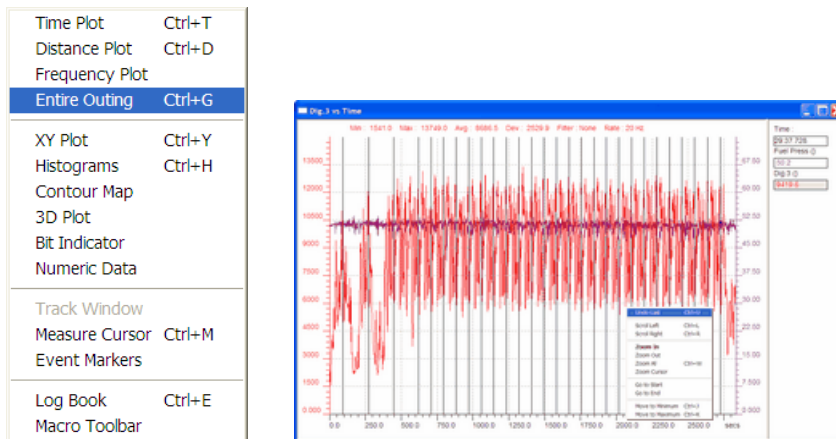
Notes

- Distance Plot requires wheel speed and distance channel logging.
- Clicking on a channel in the file folder makes it the new current channel.
- Right click over the left axis to open the channel scaling popup menu.

Entire Outing

If you are using a track beacon typically you will look at data for a single lap or part of a lap. You can use this function to look at data from more than one lap at a time or even for the entire outing.

1. On the Menu Bar under **View**, click **Entire Outing**. Or click Icon on tool bar 



The current plot will change and display the channels loaded in the file folder for the entire outing. The scale for the current channel is displayed on the left axis and additional channel information is displayed at the top of the graph.

2. Move the cursor horizontally to a point of interest.
3. Right click to open the zoom and scroll popup menu.

Double-click over a particular lap to make it the current lap and exit the entire outing view mode. You can also use the **Group Laps** feature to look at several consecutive laps from the same outing.

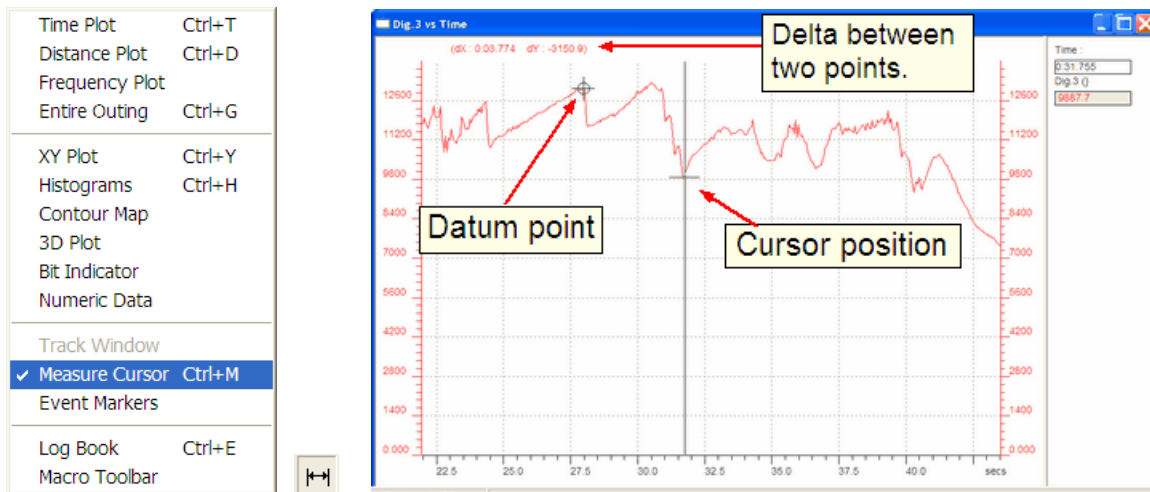
Notes

- Clicking on a channel in the file folder makes it the new current channel.
- Right click over the left axis to open the channel scaling popup menu.

Measure Cursor

Use this menu to open the measure cursor function. This feature allows you to measure the difference in channel values between two points on a time or distance plot.

1. On the Menu Bar select **View**, click **Measure Cursor**. Or select Icon from toolbar 



The measure cursor datum point will show at the cursor position for the current channel.

2. Click on the graph to locate the position of the datum point.
3. Move the cursor over the graph to the measure point.

The numeric display at the top of the window will update and show the delta x and y values for the current channel as the cursor position changes.

4. Click on a channel in the file folder and repeat to measure a different channel.

Notes

- Measure Cursor on distance plot requires wheel speed and distance channel logging.
- The measure cursor function is disabled anytime the graph is refreshed.

Logbook

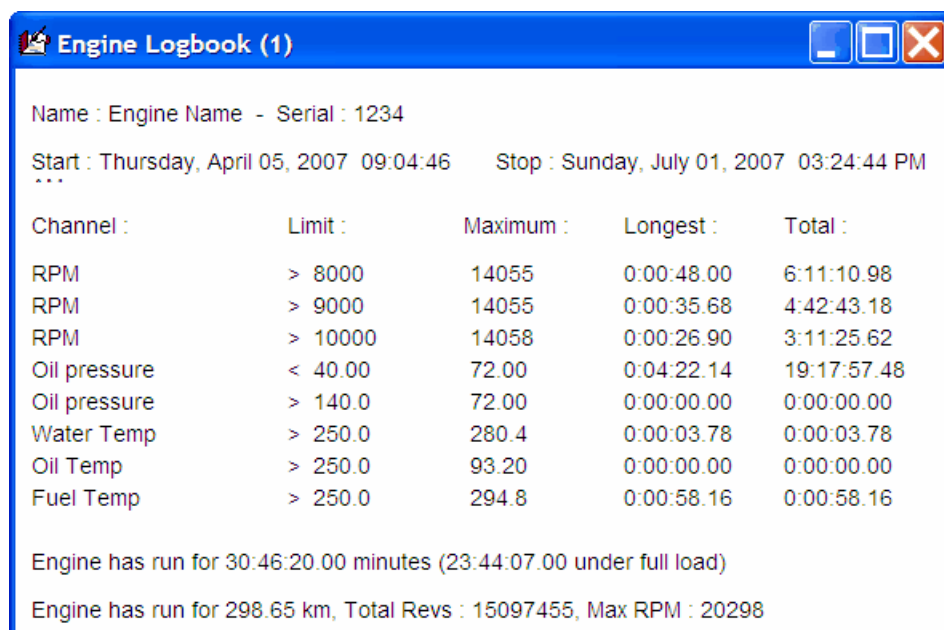
Use this function to open the engine log book. This report provides detailed information about an engines on load history. It provides cumulative data from when the logbook was last reset.

1. On the **View** menu, click **Logbook**.

The log book window will open and display a tabular report of the eight user defined engine channels. The logbook start and stop time and date are displayed at the top of the report. The following information is displayed for each channel

2. The maximum value for the channel.
3. The longest time spent above/below the threshold.
4. The total time spent above/below the threshold.

The total running time, time under load, total distance and number of engine revolutions are also displayed on the report.



The screenshot shows a window titled "Engine Logbook (1)" with a blue border and standard Windows window controls. Inside, the text "Name : Engine Name - Serial : 1234" is at the top. Below it, the start and stop times are listed: "Start : Thursday, April 05, 2007 09:04:46" and "Stop : Sunday, July 01, 2007 03:24:44 PM". A table follows with five columns: Channel, Limit, Maximum, Longest, and Total. The table contains eight rows of data for various engine parameters. At the bottom, two summary lines are displayed: "Engine has run for 30:46:20.00 minutes (23:44:07.00 under full load)" and "Engine has run for 298.65 km, Total Revs : 15097455, Max RPM : 20298".

| Channel : | Limit : | Maximum : | Longest : | Total : |
|--------------|---------|-----------|------------|-------------|
| RPM | > 8000 | 14055 | 0:00:48.00 | 6:11:10.98 |
| RPM | > 9000 | 14055 | 0:00:35.68 | 4:42:43.18 |
| RPM | > 10000 | 14058 | 0:00:26.90 | 3:11:25.62 |
| Oil pressure | < 40.00 | 72.00 | 0:04:22.14 | 19:17:57.48 |
| Oil pressure | > 140.0 | 72.00 | 0:00:00.00 | 0:00:00.00 |
| Water Temp | > 250.0 | 280.4 | 0:00:03.78 | 0:00:03.78 |
| Oil Temp | > 250.0 | 93.20 | 0:00:00.00 | 0:00:00.00 |
| Fuel Temp | > 250.0 | 294.8 | 0:00:58.16 | 0:00:58.16 |

Engine has run for 30:46:20.00 minutes (23:44:07.00 under full load)
Engine has run for 298.65 km, Total Revs : 15097455, Max RPM : 20298

Notes

- The engine log book can only be reset by using the **Reset Logbook** function in USB comms.

Event Markers

Use this menu to enable the event marker function. This feature displays information on when a channel value reaches a certain condition as defined by the settings in the event marker editor. e.g. When the engine rpm exceeded a threshold, how long the event occurred and what was the maximum value.

1. On the **View** menu, click **Event Markers**.



2. The event markers feature is now enabled.

3. Click on the menu again to disable this feature.

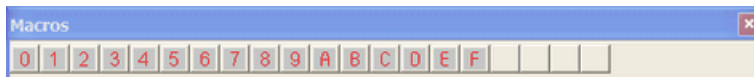
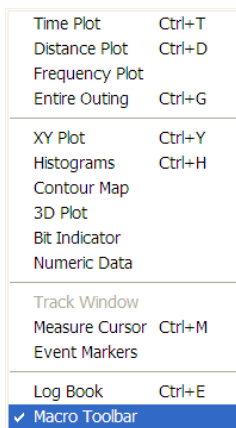
Notes

- Right click over the left axis to open the scaling's and event marker editor menu.
- Event markers can individually be set and enabled for each channel.

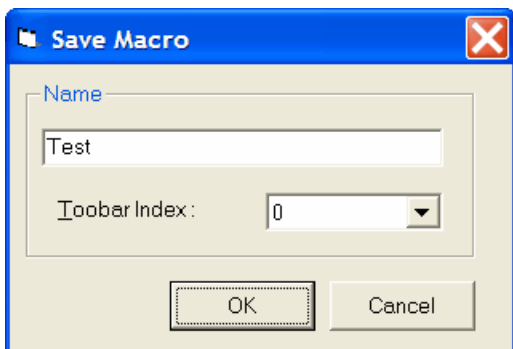
Macro Toolbar

Use this menu to open the macro toolbar. The toolbar is highly recommended for a convenient way to quickly review your data. After setup, any of the previously defined channel and window layouts can be instantly displayed by clicking on a index button in the Macro Toolbar window. Up to fifteen different layouts can be saved using the **(F7) Save Macro** function in the Window menu.

1. On the **View** menu, click **Macro Toolbar**.



2. The toolbar will be displayed.
3. To save a defined Plot and Channels select **F7**, the Save Macro window will display. Assign a Macro name and available index number.



Example: With Time Plot open and 8 EGT channels and RPM plotted select F7, name as EGT's in toolbar index 0, select **OK** to save. With any data file open simply click index 0 from Macro Toolbar and EGT plot will display. Create up to fifteen other Macro Toolbar shortcuts.

Notes

- Using any macro will delete the current channels and window layout.

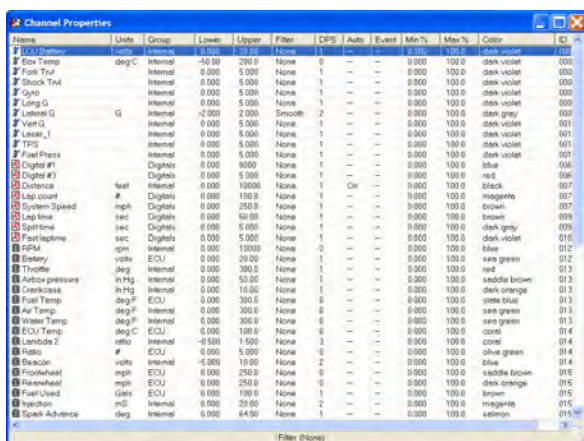
Edit

Channel Properties

Use this function to view and edit each of your global channel settings.

1. On the Menu Bar under **Edit**, click **Channel Properties**

The channel properties window will open and display all of your logger channels along with the parameters defined for each. This window supports name filtering. Press the first letter of a channel name and the window will automatically refresh but only displaying the channels that start with that letter. You can also sort channels by clicking on the top of any of the columns.



2. Double-click on a channel and the parameter edit window will open.

3. Edit each of your channel settings.



You can edit any of the channel parameters except the **Name** and ID. Channel names can only be changed in [Channel Parameters](#) in the Calibration Editor of the Configuration module.

4. Click OK.

5. Repeat step 2 for additional channels.

6. Close the window to save your changes.

Outing Info

This function allows the user to edit the outing information stored with the current data set.

1. On the Menu Bar under **Edit**, click **Outing Info**.
2. Edit the outing information as required.
3. Edit any text **Comments** for the data set.



You can also edit the start lap, session and outing numbers from this window. An offset to the lap count can also be made by setting the number of pace laps.

4. Click **OK** to save changes.

Notes

- Changes made to the outing information are permanently saved with the current data set.

Define Math Channels

Creating

Use this function to create or edit your math channels. This feature allows complex math functions to be created using your existing channels in combination with predefined functions, operators and constants. Math channels can be treated as ordinary channels and can be graphed, included in reports and even nested in other math channels.

1. On the **Edit** menu, click Define **Math Channels**.

The math channel editor window will open and display any math channels that have been defined. The math string text window is a simple editor and can be written to directly or you can double-click in any of the list boxes to bring a channel, function, operator or constant into the math text string.

2. Under **Channels** select **Create New Channel**.

3. Enter a **Name** for the new math channel.

It is recommended that you select non-ambiguous names for your math channels and that they are dissimilar to any existing channels and defined constants. The minimum number of characters allowed for a math channel name is 2. Any blank characters in the name will automatically be filled with the underscore character.

4. Click **OK**.

5. Enter the math string for your new function. Enter manually or select available functions and operators from window.

Certain operators have a higher precedence than others and effect how channels are calculated. Multiplication and Division have higher precedence than Addition and Subtraction. If in doubt you can use parenthesis when writing your math strings

6. Under **File** select **Save Changes**.

- Your Math Channel is now available in the **Add Channel Menu**.

Notes

- Before you can test a math channel it must be first be created and saved.
- Use the **Select** menu or **Name** button to view a different channel.
- Use the **Delete** menu to remove an existing math function.

Importing

Use this function to import predefined math functions.

1. On the **Edit** menu, click **Define Math Channels**.
2. Click on the **Import** menu.
3. Select the drive and folder where the math (*.TXT) file is stored.
4. Double-click on the file or click **OK** to open it.
5. Select the math functions you wish to import from the list.
6. Click **OK**.
7. You will be prompted to confirm if any duplicate names exist.
8. Click **OK** to accept the changes.

Notes

- You can use the **Export** menu to save math functions to a (*.TXT) file.

Math Operators

| Operator | Description |
|----------|---------------------------|
| + | Arithmetic summation |
| - | Arithmetic subtraction |
| * | Arithmetic multiplication |
| / | Arithmetic division |
| ^ | Arithmetic power |
| => | Boolean greater or equal |
| > | Boolean greater than |
| <= | Boolean less or equal |
| < | Boolean less |
| & | Boolean logical AND |
| | Boolean logical OR |
| # | Boolean exclusive OR |
| % | Modulo arithmetic |
| = | Boolean equal |
| != | Boolean not equal |

Notes

- Boolean functions return a value of zero (0) for false and one (1) for true.

Math Functions

Available Functions

ABS() - Returns the absolute value of the operand. The absolute value of a number is its unsigned magnitude. For example, ABS(-1) and ABS(1) both return 1.

ACos() - Returns the arccosine value of the operand. The ACos function takes the ratio of two sides of a right triangle and returns the corresponding angle in radians. The ratio is the length of the side adjacent to the angle divided by the length of the hypotenuse.

ASin() - Returns the arcsine value of the operand. The ASin function takes the ratio of two sides of a right triangle and returns the corresponding angle in radians. The ratio is the length of the side opposite the angle divided by the length of the hypotenuse.

ATan() - Returns the arctangent value of the operand. The ATan function takes the ratio of two sides of a right triangle and returns the corresponding angle in radians. The ratio is the length of the side opposite the angle divided by the length of the side adjacent to the angle.

Avg() - Returns the lap average value of the operand. The Avg function sums the channel values for the current lap and divides the result by the total number of samples.

Ceil() - Returns the lap maximum value of the operand. The Ceil function finds the maximum value for the current lap and returns this value for all samples.

Cos() - Returns the cosine value of the operand. The Cos function takes an angle and returns the ratio of two sides of a right triangle. The ratio is the length of the side adjacent to the angle divided by the length of the hypotenuse.

Delta() - Returns the difference between two values. The Delta function returns the difference between the operand of the datum lap and the current lap. If no datum is loaded a value of zero is returned.

Deriv() - Returns the derivative value of the operand. The Deriv function calculates the rate of change of the operand at 3 sample intervals.

Exp() - Returns the exponential value of the operand, e (the base of natural logarithms) raised to a power. The Exp function complements the action of the Log function and is sometimes referred to as the antilogarithm. The constant e is approximately 2.718282.

Floor() - Returns the lap minimum value of the operand. The Floor function finds the minimum value for the current lap and returns this value for all samples.

Gate_Avg() - Returns the gated lap average of the operand. The Gate_Avg function calculates the average value of the operand but only using values that are not zero.

Integ() - Returns the integral value of the operand. The integ function calculates a running summation of the operand at 3 sample intervals.

Ln() - Returns the natural logarithmic value of the operand. The natural logarithm is the logarithm to the base e.

Log() - Returns the base-10 logarithmic value of the operand. It is calculated by dividing the natural logarithm of the operand by the natural logarithm of 10.

Max() - Returns the running maximum value of the operand. The Max function tracks the maximum value of the operand for the current lap.

Min() - Returns the running minimum value of the operand. The Min function tracks the minimum value of the operand for the current lap.

Not() - Returns the inverse value of the operand. The Not function returns the logical negation of the operand. In addition the Not operator inverts the bit values of the operand.

Sin() - Returns the Sin value of the operand. The Sin function takes an angle and returns the ratio of two sides of a right triangle. The ratio is the length of the side opposite the angle divided by the length of the hypotenuse.

Sqrt() - Returns the square root of the operand. The operand must be a value greater than or equal to zero

Tan() - Returns the tangent value of the operand. Tan takes an angle and returns the ratio of two sides of a right triangle. The ratio is the length of the side opposite the angle divided by the length of the side adjacent to the angle.

Notes

- The trigonometric functions return values expressed in radians.
- To convert degrees to radians, multiply degrees by $\pi/180$. To convert radians to degrees, multiply radians by $180/\pi$.

Math Examples

Note: The following math channels are examples and should be treated as such. Their accuracy and usefulness is not guaranteed.

| | |
|-------------|---|
| Name | Engine_Rate |
| Syntax | Deriv(RPM / 60) |
| Channels | RPM |
| Definition | The rate of change of engine speed. |
| - | |
| Name | Brake_Bias |
| Syntax | F Brake Pressure / (F Brake Pressure + R Brake Pressure) * 100 |
| Channels | Front and Rear Brake Pressures |
| Definition | The ratio of the braking pressures front to rear. |
| - | |
| Name | Compare_ET |
| Syntax | Delta(Elapsed Time) |
| Channels | Elapsed Time |
| Definition | The cumulative time difference between the datum and current lap. |
| - | |
| Name | Gear_Ratio |
| Syntax | (RPM / 60) / (Speed / (0.680 * 3.1415)) |
| Channels | RPM and Speed |
| Definition | The ratio of speed between the engine and driven wheels. |
| - | |
| Name | Ride_Height |
| Syntax | (FL Damper + FR Damper + RL Damper + RR Damper) / 4 |
| Channels | Vehicle Dampers |
| Definition | The simple definition of vehicle ride height. |

Notes

- It is recommended to use constants to define any numeric values to improve calculation accuracy and speed.

Define Constants

Creating

Use this function to create or edit your system constants. Constants are names that equate to numeric values used in your math channels and can be global or outing dependant. Use the appropriate check box to select which type you want to edit.

Global constants are made available for all math channels for values that do not change from one outing to the next. Outing dependant constants are for values that change with each outing and are stored with the current data set.

1. On the **Edit** menu, click **Define Constants**.
2. Click on the **Create** button.
3. Enter the **Name** for the new constant and its **Value**.

Analysis also supports the use of links for defining constants. See the section on defining and using links later in this section.

4. Click **OK**.
5. Repeat step 2 for additional constants.
6. Click **OK** to accept the changes.

Using Constants

When a math channel that contains a constant is calculated, analysis first looks in the list of outing dependant constants. If the value is not found a search is then made in the global constant list. If neither list contains the constant the math channel cannot be calculated.

Defining Links

Constants can also be defined by links to values in the cells of a spreadsheet application such as Microsoft Excel. The syntax for defining a constant link is :

Application Name | Sheet Name | Row Number | Column Number. e.g. excel|sheet1!r4c8.

This example would return the value from row 4, column 8 of sheet 1 of an open Excel spreadsheet. If the application is not open or the cell does not contain a number a value of zero is returned.

Notes

- You can use the Copy to Outing menu to copy all global constants to the current outing.

Importing

Use this function to import system constants.

1. On the **Edit** menu, click **Define Constants**.
2. Click on the **Import** menu.
3. Select the drive and folder where the constant (*.TXT) file is stored.
4. Select the drive and folder where the constant (*.TXT) file is stored.
5. Double-click on the file or click **OK** to open it.
6. Select the constants you wish to import from the list.
7. Click **OK**.
8. You will be prompted to confirm if any duplicate names exist.
9. Click **OK** to accept the changes.

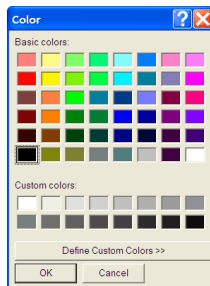
Notes

- You can use the **Export** menu to save constants to a (*.TXT) file.

Color Palette

Use this function to edit the system palette colors.

1. On the **Edit** menu, click **Color Palette**.
2. Click on the **Color** you want to edit.



3. Select a new color from the windows palette.
4. Click **OK**.
5. Repeat step 2 for additional colors.
6. Click **OK** to accept the changes.

Notes

- Custom colors can be defined using the windows palette control.

Current Calibration

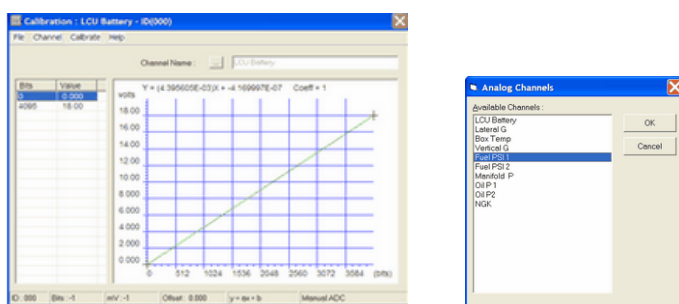
Use this function to view and edit the calibrations of your analog channels for the current data set. Editing the calibration for the current data set has no effect on the calibration in your setup file. The edited channel calibration will be saved with the current data set.

1. On the Menu Bar under **Edit**, click **Current Calibration**.

The calibration window will open and display the first analog channel.

2. Under **Channel** on the Calibration window menu bar click **Select Channel**.

3. Select the channel for calibration and click **OK**.



If you are connected to your LCU the real-time channel reading in the lower status bar is active showing the current output from the sensor and can be used to monitor the response of the sensor as it moves. The calibration points in the grid are plotted on the graph.

The calibration window will display the x y points for the selected channel and refresh the graphic display. Make sure that the Manual ADC menu is unchecked if you want to edit your calibration using direct sensor readings.

4. Edit the calibration points by clicking on the values.
5. Apply or clear any calibration offsets.
6. Repeat step 2 for additional channels.
7. Close the calibration window to save your changes.

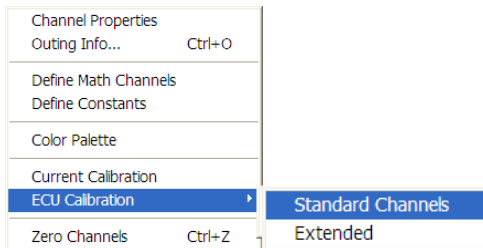
Notes

- Editing a sensor calibration in the analysis application will only apply to the current data set.

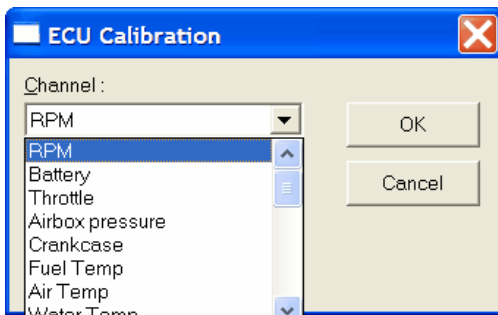
ECU Calibration

This function allows you to edit the calibrations of the ECU channels for the current data set if you are data streaming data from an Edelbrock ECU. ECU channels are calibrated into engineering units by applying a scale and offset to the raw data.

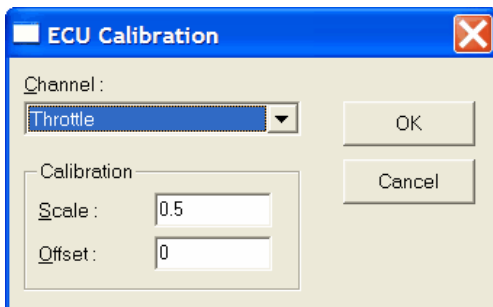
1. On the Menu Bar under **Edit**, click **ECU Calibration**.
2. Select **Standard Channels** or **Extended**.



3. Select the channel you want to edit from the combo box.



4. Enter the calibration Scale value.
5. Enter the calibration Offset value.



6. Repeat step 2 for any additional channels.
7. Click OK to save changes.

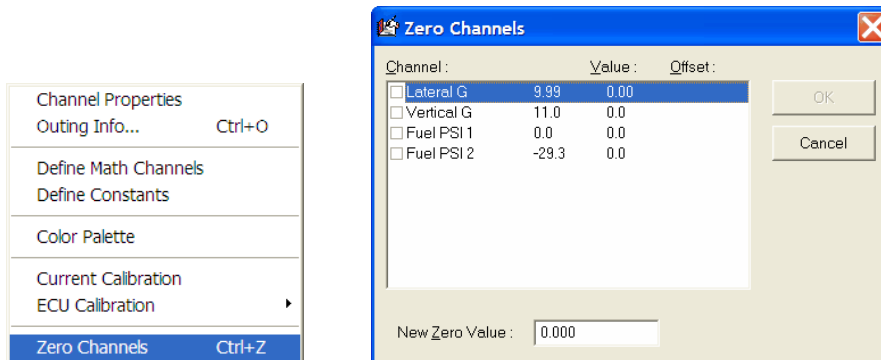
Notes

- Editing a sensor calibration in the analysis application will only apply to the current data set.

Zero Channels

This function allows you to zero a channel calibration for the current data set. In certain conditions you may find it useful to make a sensor read zero at a particular measurement. e.g. to set the vehicle ride height or neutral position of a gear position sensor.

1. Under **Edit** on the Menu Bar, select **Zero Channels**.
2. Select the channels you want to zero from the listbox.



The current values for each channel at the current cursor location along with any existing offsets are displayed in the listbox.

3. Enter the new Zero value.
4. Click **OK**.
5. Select **YES** when prompted to apply offset.

Notes

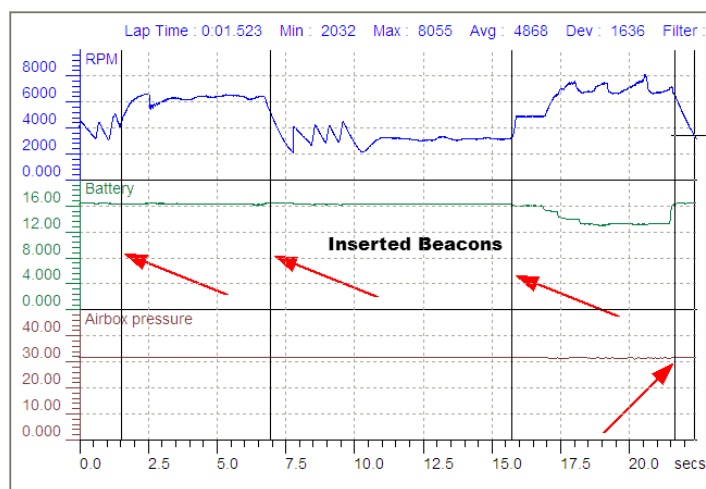
- Use the calibration editor to remove offsets applied to a sensor calibration.
- Editing a sensor calibration in the analysis application will only apply to the current data set.

Track

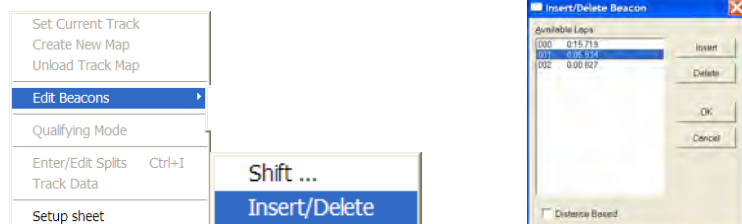
Insert Beacon

Use this function to enter lap beacons in the current data set. Beacons are useful when used to create a lap by indicating the start and finish points on a run. By selecting the data between the two beacons useless data is not displayed.

To insert a beacon in displayed data right click on the desired beacon location and select Insert Beacon. Select yes to verify the inserted beacon location.



You can also edit beacons by selecting **Edit Beacons** under **Track** on the menu bar.



Select **Insert/Delete** to open the beacon editor window.

Select **Insert** to insert a new beacon at a specific time or highlight a existing beacon position and select **Delete** to remove.

Select **Shift..** to shift all beacons by a designated time.

Notes

- Any changes to the beacon data are permanently saved in the data set.

Setup Sheet

To view and edit the setup sheet notes select **Setup Sheet** under **Track** on the menu bar.

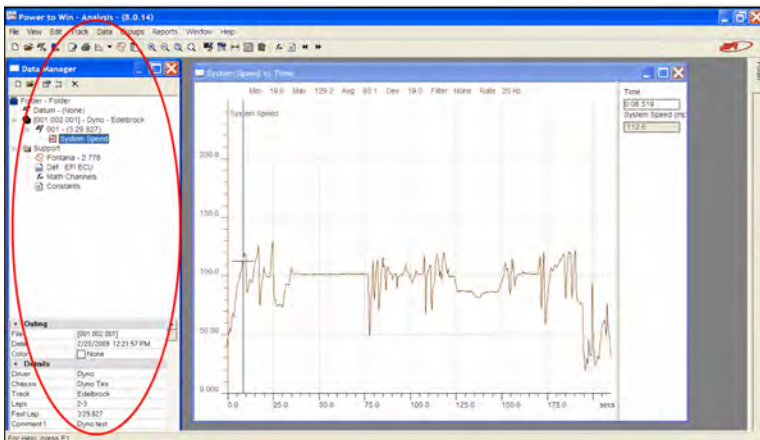
Data

Hide File Folder

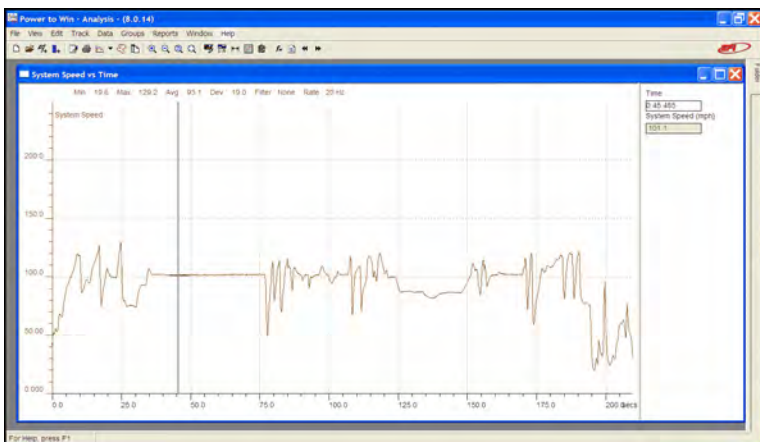
To maximize the viewing area for your graphs you can use this option to hide the file folder window.

1. On the Menu Bar under **Data**, select **Hide File Folder**.

BEFORE



AFTER



2. The file folder will be hidden and the menu will be checked.
3. Click on the menu again to restore the view.

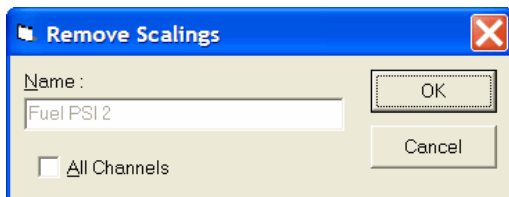
Notes

- You can also use the **F5** hot key to perform this function.

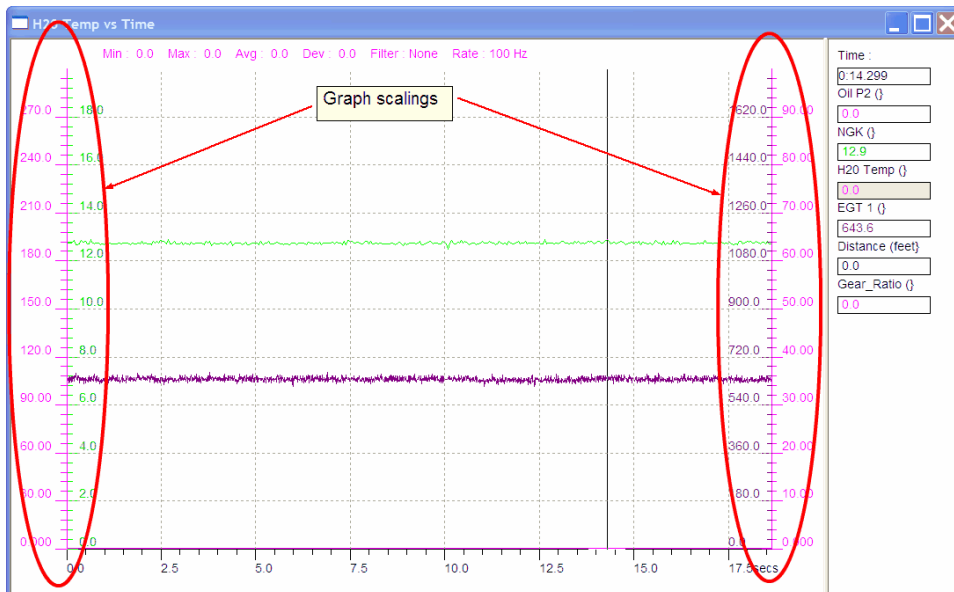
Remove Scalings

Use this function to undo any temporary scaling changes that have been applied to the graph for the current channel or channels.

1. On the **Data** menu, click **Remove Scaling's**.
2. The edit window will open and display the current channel.
3. Click on the **All Channels** check box if required.



4. Click **OK** to save changes.



Notes

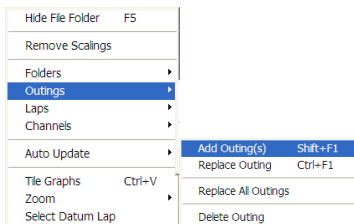
- Channel scaling's cannot be removed if the **Make Global** check box was selected in the edit scaling's window.

Outings

Add Outings

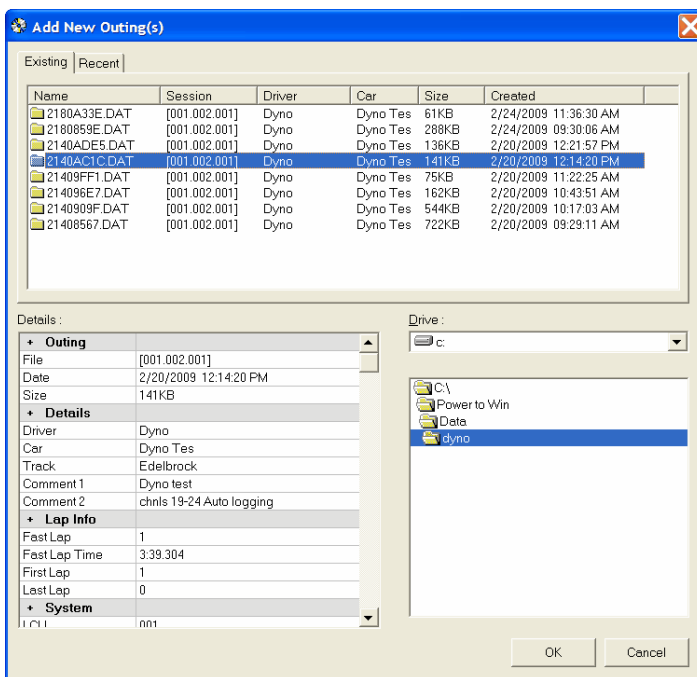
Use this function to add a new dataset to the File Folder.

1. On the **Data** menu, click **Outings**, **Add Outing(s)**



2. Select the drive and folder where the dataset is located.

3. Click on the dataset to read the file details and comments.



4. Double-click the dataset or click OK to open it.

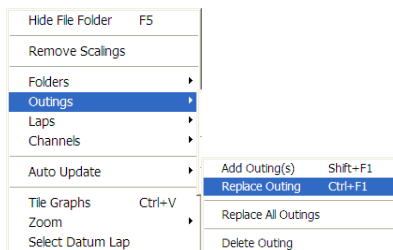
Notes

- To open a file you've used recently, you can use the **Recent File** menu list.
- You can use the **Replace Outing** menu to replace the current outing.
- Only dataset files of the type (*.DAT) can be read by Analysis.
- Analysis can be set to automatically open the last downloaded data file. For details see [Auto Update](#).

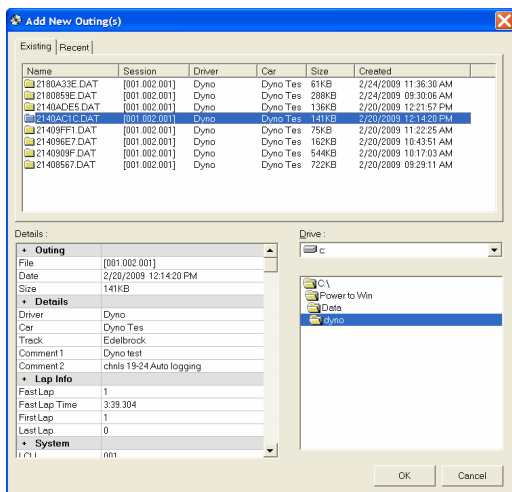
Replace Outings

Use this function to replace the current dataset in the File Folder.

1. On the **Data** menu, click **Outings**, **Replace Outing**.



2. Select the drive and folder where the new dataset is located.



3. Click on the dataset to read the file details and comments.

4. Double-click the dataset or click **OK** to select it.

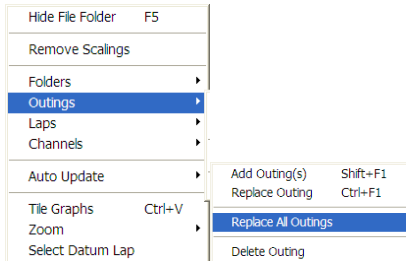
Notes

- To open a file you've used recently, you can use the **Recent File** menu list.
- You can use the **Add Outing** menu to add a new outing to the File Folder.
- Only dataset files of the type (*.DAT) can be read by Analysis.
- Analysis can be set to automatically open the last downloaded data file. For details see [Auto Update](#).

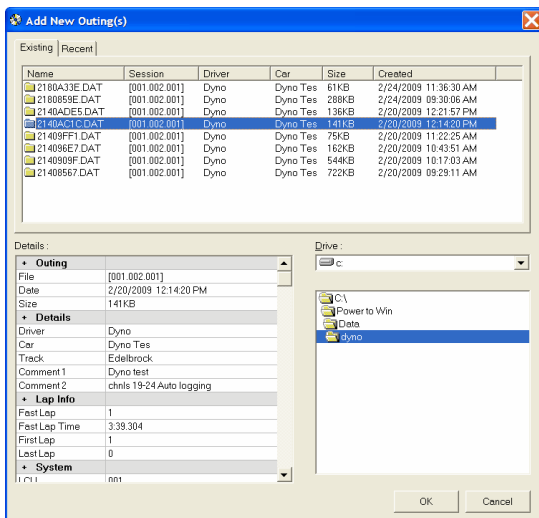
Replace All Outings

Use this function to delete all of the datasets currently loaded in the File Folder and replace them with a single new outing.

1. On the **Data** menu, click **Outings**, **Replace All Outings**.



2. Select the drive and folder where the new dataset is located.
3. Click on the dataset to read the file details and comments.



4. Double-click the dataset or click **OK** to select it.
5. The currently loaded outings will all be deleted.

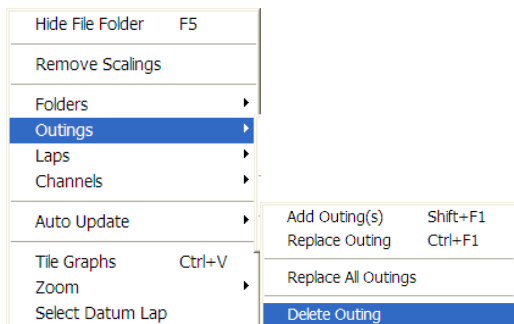
Notes

- To open a file you've used recently, you can use the **Recent File** menu list.
- You can use the **Add Global** menu to add an outing to all open folders.

Delete Outing

Use this function to delete the current dataset from the File Folder.

1. On the **Data** menu, click **Outings**, **Delete Outing**.



2. The current outing will be removed from the file folder.

Notes

- To open a file you've used recently, you can use the **Recent File** menu list.

Laps

Next Lap

Use this function to replace the current lap with the next lap in the loaded outing.

1. On the **Data** menu, click **Next Lap**.
2. The current lap will be replaced with the next in sequence.

Notes

- You can also use the **Ctrl+N** hot key to perform this function.

Previous Lap

Use this function to replace the current lap with the previous lap in the loaded outing.

1. On the **Data** menu, click **Previous Lap**.
2. The current lap will be replaced with the previous in sequence.

Notes

- You can also use the **Ctrl+B** hot key to perform this function.

Add Laps

Use this function to add one or more laps to the loaded outing in the file folder.

1. On the **Data** menu, click **Add Lap(s)**.
2. The available laps in the current outing will be displayed.
3. Select the lap(s) to add to the outing of the file folder.
4. Click **OK** to add the selected lap(s).

Notes

- You can also use the **Shift+F3** hot key to perform this function.
- Select the **Color** button if you wish to set the selected lap to a single color.

Replace Current

Use this function to replace the current lap in the file folder.

1. On the **Data** menu, click **Replace Current**.
2. The available laps in the current outing will be displayed.
3. Select the lap to replace in the outing of the file folder.
4. Click **OK** to replace the current lap.

Notes

- You can also use the **Ctrl+F3** hot key to perform this function.
- Select the Color button if you wish to set the selected lap to a single color.

Group Laps

Use this function if you want to display several adjacent laps at the same time. Group laps are displayed side by side and are not overlaid.

1. On the **Data** menu, click **Group Laps**.
2. Enter the number of adjacent laps to display at a time.
3. Select the **Entire Outing** check box for all available laps.
4. Click **OK** to save the changes.

Notes

- You can also use the **F3** hot key to perform this function.

Delete Current

Delete Current Lap

Use this function to delete the current lap from the file folder.

1. On the Data menu, click Delete Current.
2. The current lap will be removed from the file folder.
3. Any open channels in the deleted lap will also be unloaded.

Notes

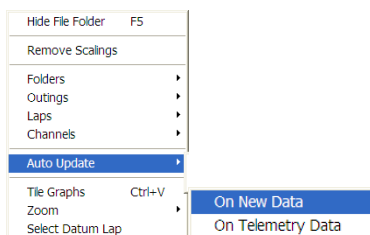
- If there is only one lap loaded the outing will be removed from the file folder.

Auto Update

This feature automatically replaces the current outing in the file folder with new data immediately after the logger download has been completed. The most recently downloaded data is displayed when Analysis is opened.

- The current outing is replaced if more than one outing is loaded in the file folder.

1. On the Data menu, click **Auto Update, On New Data**.



2. The auto update feature is now active and the menu will be checked.

3. Click on the menu again to deactivate the feature.

Tile Graphs

This feature changes the full graph view into tiles for each individual channel loaded in the file folder. There are two mode of operation for this feature.

Automatic - The graph is evenly divided into the number of channels loaded in the file folder.

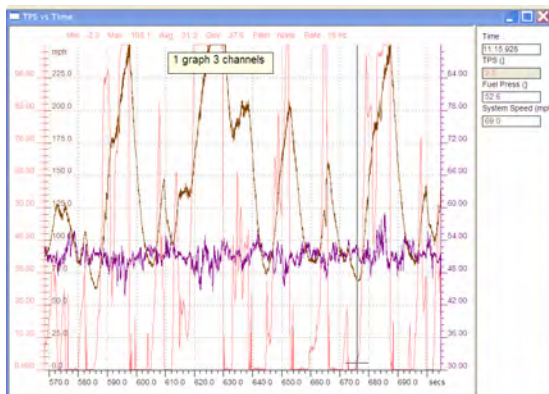
Manual - The screen percentage used for each channel is set manually under channel parameters.

1. On the Menu Bar under Data, click Tile Graphs.

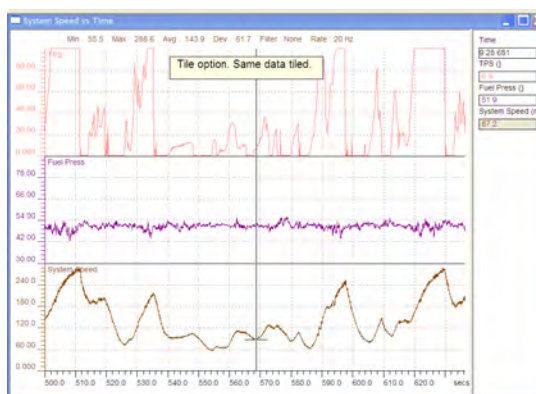
2. Tile mode is now selected and the menu will be checked.

3. Click on the menu again to restore the standard view.

Before



After




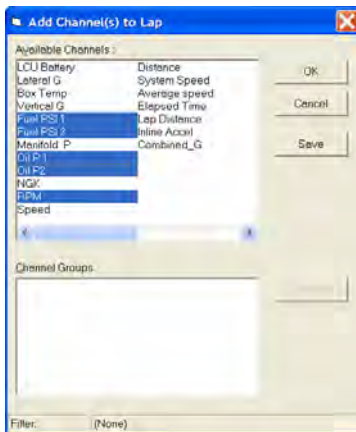
Notes

- Tile mode settings can be changed under the File, Options menu.

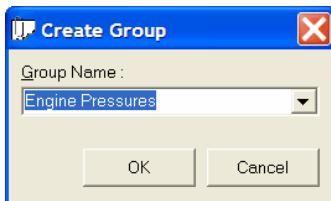
Groups

Channels can be grouped for quick access. Examples of groups may be Engine pressures, Engine Temps, Nitrous, Chassis, Speed etc. When a group is selected the channels in that particular group are displayed.

1. To organize channel groups on the menu bar under **Data** select **Channels**, **Add Channels** or the icon  from the toolbar.
2. Hold the Ctrl key and select the channels you wish to Group.




3. Select save and assign the Group a name.



4. Select ok to save the Group.

Notes

- To access your group, open the add channels window  and select the group name.
- To delete a Channel Group highlight group name and select **Delete**.


Reports

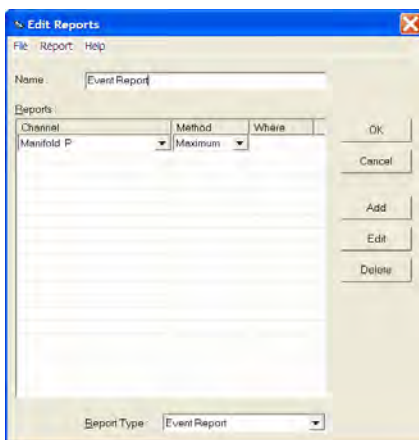
Setup

This function allows the downloaded data for the current dataset to be organized in reports and formatted to a Microsoft Excel Sheet.

1. From the Reports Menu select **Setup**.
2. Select a template and Application.
3. Select the **Reports** tab.



4. Select the New icon  to create a new Report.
5. Assign a **report Name**, select **Report Type** and click **Add** to add channels. Edit channels and method with channel pull downs. Click **OK** to exit window, hit **Apply** in setup window and **OK** to save.



Notes

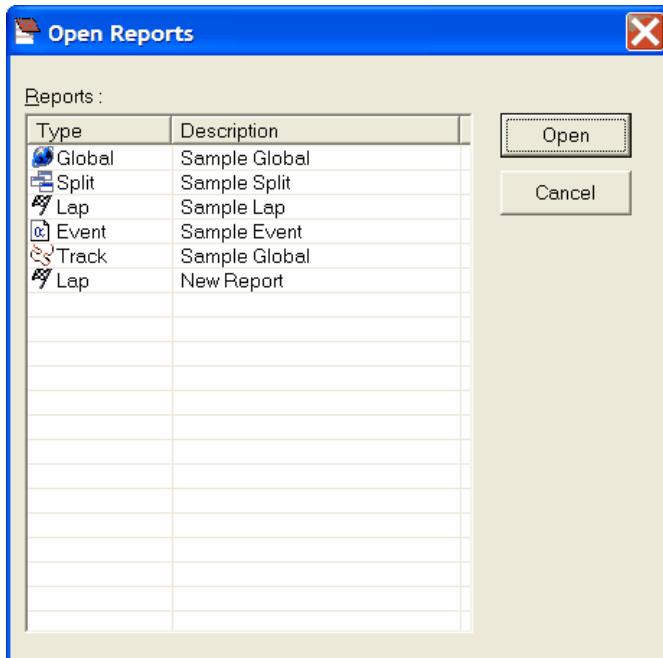
To open a Excel Report open [Excel Reports](#) and double click report, Excel will open and display your report.

Excel Reports

On the Menu Bar under **Reports** select **Excel Reports**.

This folder contains the reports created in the [Setup](#) reports folder.

Double click on a Report to open the Excel Sheet for your current dataset.



| Lap | Time | TPS Max | TPS Min | AFR#1 Min | Coolant Temp Max | Dig.3 Max | Dig.3 Min |
|-----|---------|---------|---------|-----------|------------------|-----------|-----------|
| 1 | 01:32.3 | 96.7 | 10.0 | 10.3 | 64.2 | 12306 | 1541 |
| 2 | 03:00.9 | 100.9 | 10.0 | 12.7 | 86.3 | 12648 | 2088 |
| 3 | 02:53.3 | 101.5 | 10.0 | 12.6 | 109.3 | 12364 | 2048 |
| 4 | 02:55.4 | 101.7 | 10.0 | 12.7 | 97.7 | 13104 | 3454 |
| 5 | 01:26.4 | 101.6 | 10.0 | 12.9 | 97.2 | 13222 | 5248 |
| 6 | 01:26.6 | 101.6 | 10.0 | 12.8 | 95.6 | 13601 | 5331 |
| 7 | 01:27.0 | 101.5 | 10.0 | 12.7 | 93.1 | 12998 | 5493 |
| 8 | 01:28.7 | 101.4 | 10.0 | 12.6 | 89.8 | 13432 | 5198 |
| 9 | 01:27.8 | 101.5 | 10.0 | 12.3 | 89.2 | 13476 | 5275 |
| 10 | 01:27.1 | 101.6 | 10.0 | 12.7 | 88.9 | 13577 | 5547 |
| 11 | 01:27.5 | 101.5 | 10.0 | 12.7 | 89.2 | 13422 | 5479 |
| 12 | 01:27.6 | 101.4 | 10.0 | 12.9 | 89.1 | 13746 | 5542 |
| 13 | 01:27.4 | 101.4 | 10.0 | 12.8 | 89.6 | 13622 | 5466 |
| 14 | 01:27.1 | 101.5 | 10.0 | 12.7 | 89.2 | 13203 | 5384 |
| 15 | 01:27.4 | 101.4 | 10.0 | 12.8 | 89.5 | 13283 | 5202 |
| 16 | 01:27.3 | 101.4 | 10.0 | 12.7 | 88.8 | 13143 | 5336 |
| 17 | 01:27.4 | 101.3 | 10.0 | 12.7 | 87.7 | 13749 | 5190 |
| 18 | 01:27.1 | 101.4 | 10.0 | 12.8 | 88.5 | 13216 | 5303 |
| 19 | 01:27.1 | 101.3 | 10.0 | 12.7 | 88.9 | 13174 | 5552 |
| 20 | 01:27.8 | 101.3 | 10.0 | 12.8 | 89.7 | 13027 | 5280 |
| 21 | 01:27.4 | 101.7 | 10.0 | 12.7 | 87.9 | 12947 | 5244 |
| 22 | 01:27.8 | 101.5 | 10.0 | 12.8 | 87.9 | 13022 | 5198 |
| 23 | 01:27.8 | 101.5 | 10.0 | 12.6 | 87.5 | 13092 | 5496 |
| 24 | 01:28.0 | 101.4 | 10.0 | 12.8 | 87.9 | 13317 | 5286 |
| 25 | 01:28.3 | 101.3 | 10.0 | 12.4 | 86.9 | 12603 | 5333 |

Analysis Icons & Hot Keys

| Hotkey | Icon | Menu | Description |
|-----------|---|----------------------|---|
| Ctrl=P |  | Print | Print the current plot or report |
| Ctrl=Q | | Exit | Exit the program |
| Ctrl+T | | Time Plot | Open the time plot window |
| Ctrl+D | | Distance Plot | Open the distance plot window |
| Ctrl+Y | | XY Plot | Open the XY plot window |
| Ctrl+H | | Histogram | Open the histogram window |
| Ctrl+M |  | Measure Cursor | Display the measure cursor |
| Ctrl+E | | Log Book | Open the engine logbook window |
| Ctrl+O |  | Outing Info | Open the edit outing data window |
| Ctrl+I | | Enter/Edit Splits | Open the split editor window |
| F5 | | Hide File Folder | Hide the logger file folder window |
| Ctrl+X | | Track and Data | Open the track map and data cursor windows |
| Ctrl+F1 | | Replace Outing | Replace the current outing in the file folder |
| Shift+F1 |  | Add Outing | Add a new outing to the file folder |
| Ctrl+N |  | Next Lap | Change to the next lap |
| Ctrl+B |  | Previous Lap | Change to the previous lap |
| F3 | | Group Laps | Open the group lap window |
| Ctrl+F3 | | Replace current lap | Replace the current lap |
| Shift+F3 |  | Add lap(s) | Add lap(s) to the current outing |
| F2 | | Replace all channels | Replace all channels in the current lap |
| Ctrl=F2 | | Replace current | Replace the current channel |
| Shift+F2 |  | Add channels to lap | Add channel(s) to the current lap |
| Shift+Del | | Delete Channel | Delete the current channel |
| Ctrl+S | | Scalings | Open the channel scaling editor |
| Ctrl+C |  | Channel color | Open the channel color editor |
| Ctrl+Z | | Zero Channels | Open the zero channel editor |
| Ctrl+G |  | Entire Outing | View the entire outing |
| Ctrl+U | | Undo Last | Undo the last zoom command |
| Ctrl+L | | Scroll Left | scroll plot to the left |
| Ctrl+R | | Scroll Right | Scroll plot to the right |
| Ctrl+W |  | Zoom All | Return full lap view |
| Ctrl+A |  | Lap report | Open the lap report window |
| Ctrl+F | | Fuel Report | Open the fuel report window |
| Ctrl+V | | Tile Graphs | Change to the tile graph view |
| Shift+F5 | | Tile Vertically | tile open windows vertically |
| Shift+F6 | | Tile Horizontally | Tile open windows horizontally |
| Shift+F7 | | save Macro | Save current screen as macro |

Harness Details

This section covers the LCU Harness details. The QwikData 2 Data Acquisition System is available in three configurations; [Basic](#), [Advanced Thermocouple](#) and [Advanced Analog](#). Harness schematics, pin-out designations and connector details for each system are available in this section. These details may be useful when setting up your QwikData 2 system.

To make the installation as easy as possible, the wiring harness provided is completely assembled with connectors that mate to the supplied sensors. Each sensor is connected to the QwikData 2 unit by simply mating the appropriate connectors.

Route the wiring harness as needed to make connections to the installed sensors. Avoid paralleling Data Log wires with any ignition wiring (primary or secondary) To connect the circular connectors on the wiring harness to the sensors, push the mating connectors firmly together and then turn the locking ring clockwise to lock the connectors together.

Refer to **Suggested Harness Routing** in the Harness Detail Section for assistance with routing your harness. With some installations it may be necessary to re-pin the LCU Connector in order to accommodate sensor location and available sensor input types. In these situations it should only be necessary to move the Analog Signal or Digital Signal wires in the LCU connector. The Sensor power and ground wires are all common. To release the pins in the LCU Connector simply depress the single white rectangular shape button on the LCU Connector. Re-locate pins as necessary in connector then depress pair of white rectangular buttons on opposite side of connector to lock pins.

BASIC SYSTEM HARNESS PART #91290

The Basic System includes a single harness with 8 analog, 4 thermistor type temperature sensor, 1 Tach Input, 1 frequency(digital) sensor connectors and 1 programmable switched output that all terminate at the 34 pin connector on the LCU. * **Inputs 7-10 are configured for thermistor type temperature sensors.**

ADVANCED THERMOCOUPLE HARNESS PART #91294

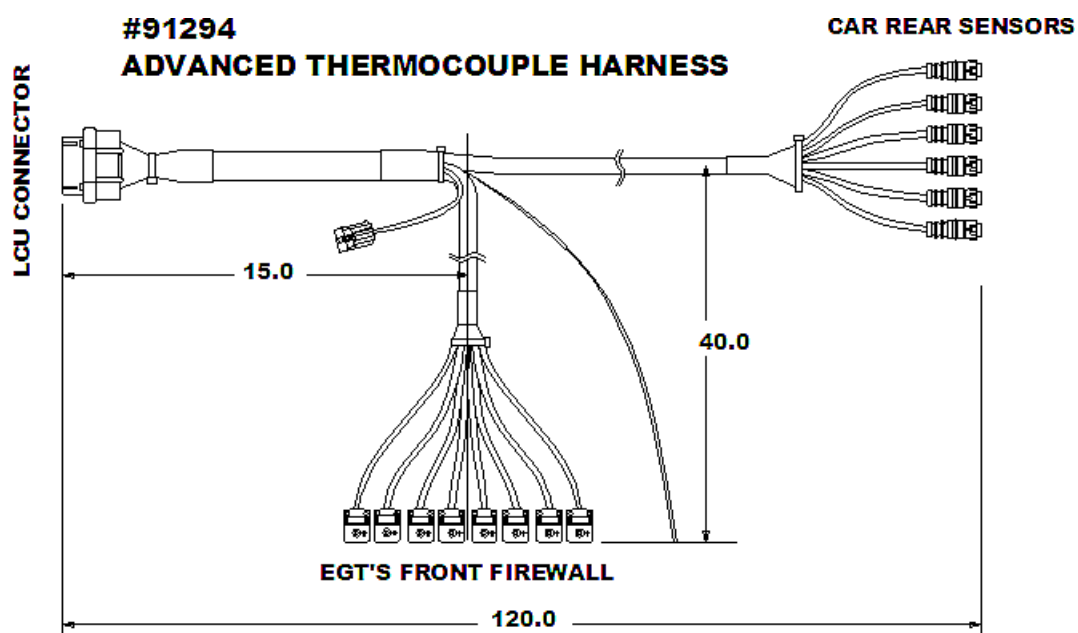
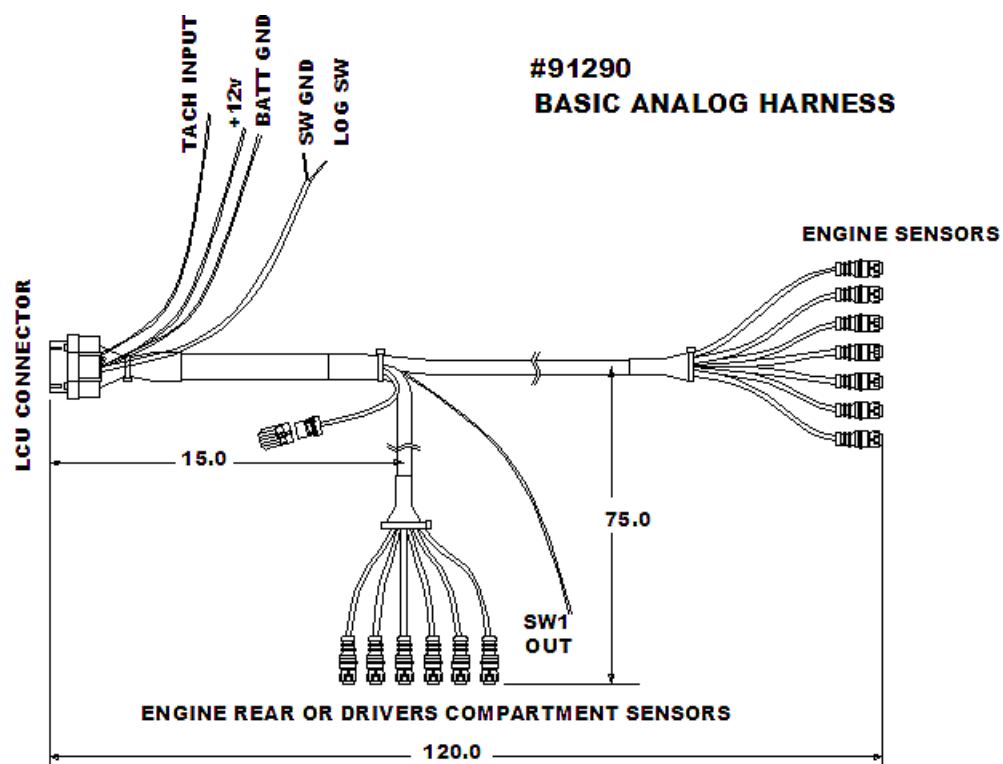
The Advanced Thermocouple System includes two harnesses; the Basic System Harness and a second harness with 4 additional Analog sensor connectors, 2 frequency(digital) sensor connectors, 8 thermocouple connectors and a additional programmable switched output that terminate at the 26 pin connector on the LCU.

* **Inputs 7-10 are configured for thermistor type temperature sensors.**

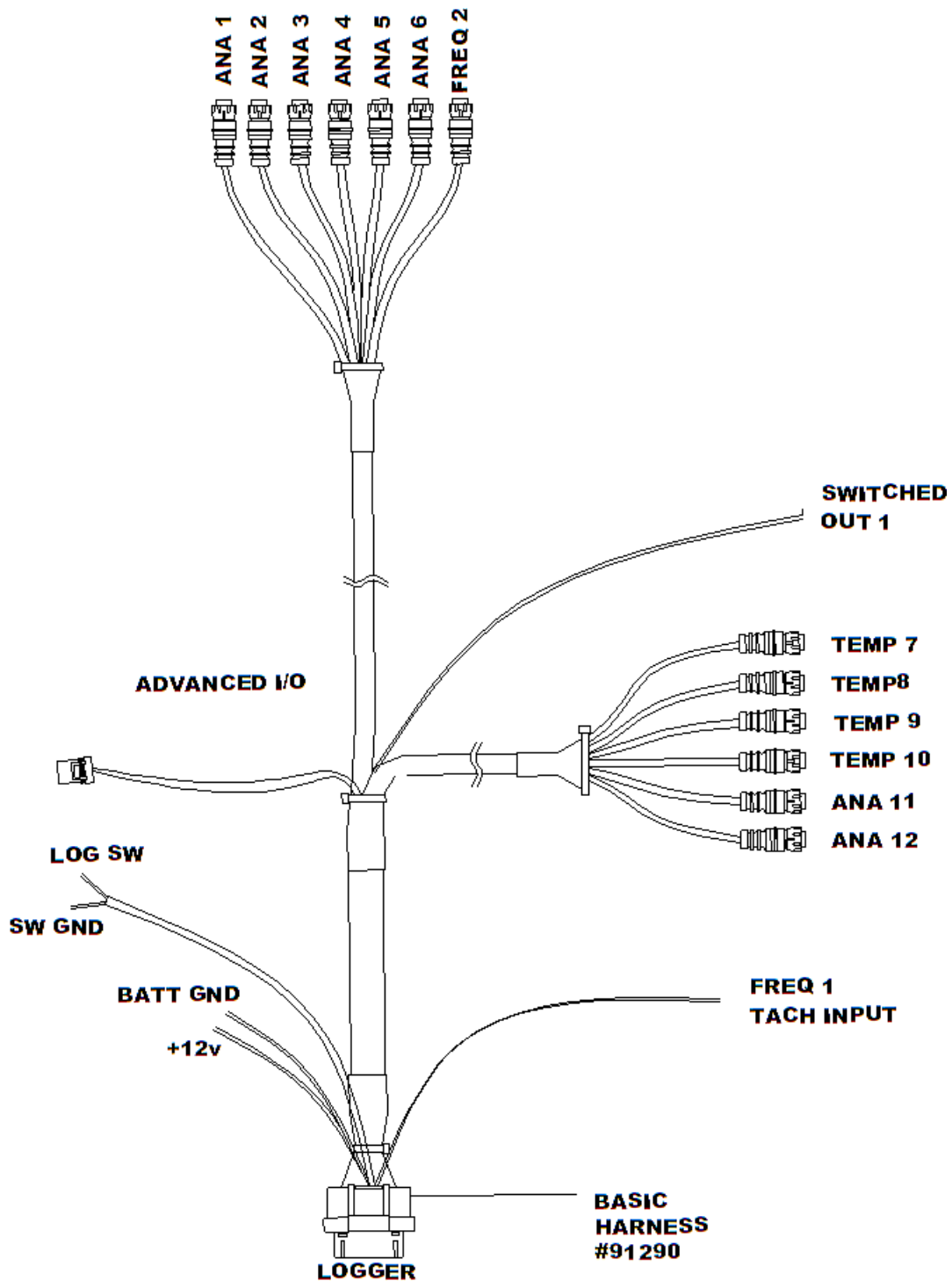
ADVANCED ANALOG HARNESS PART #91291

The Advanced Analog System includes two harnesses; the Basic System Harness and a second harness with 12 analog sensor connectors, 2 frequency(digital) connectors and a additional programmable switched output that terminate at the 26 pin connector on the LCU. * **Inputs 7-10 are configured for thermistor type temperature sensors.**

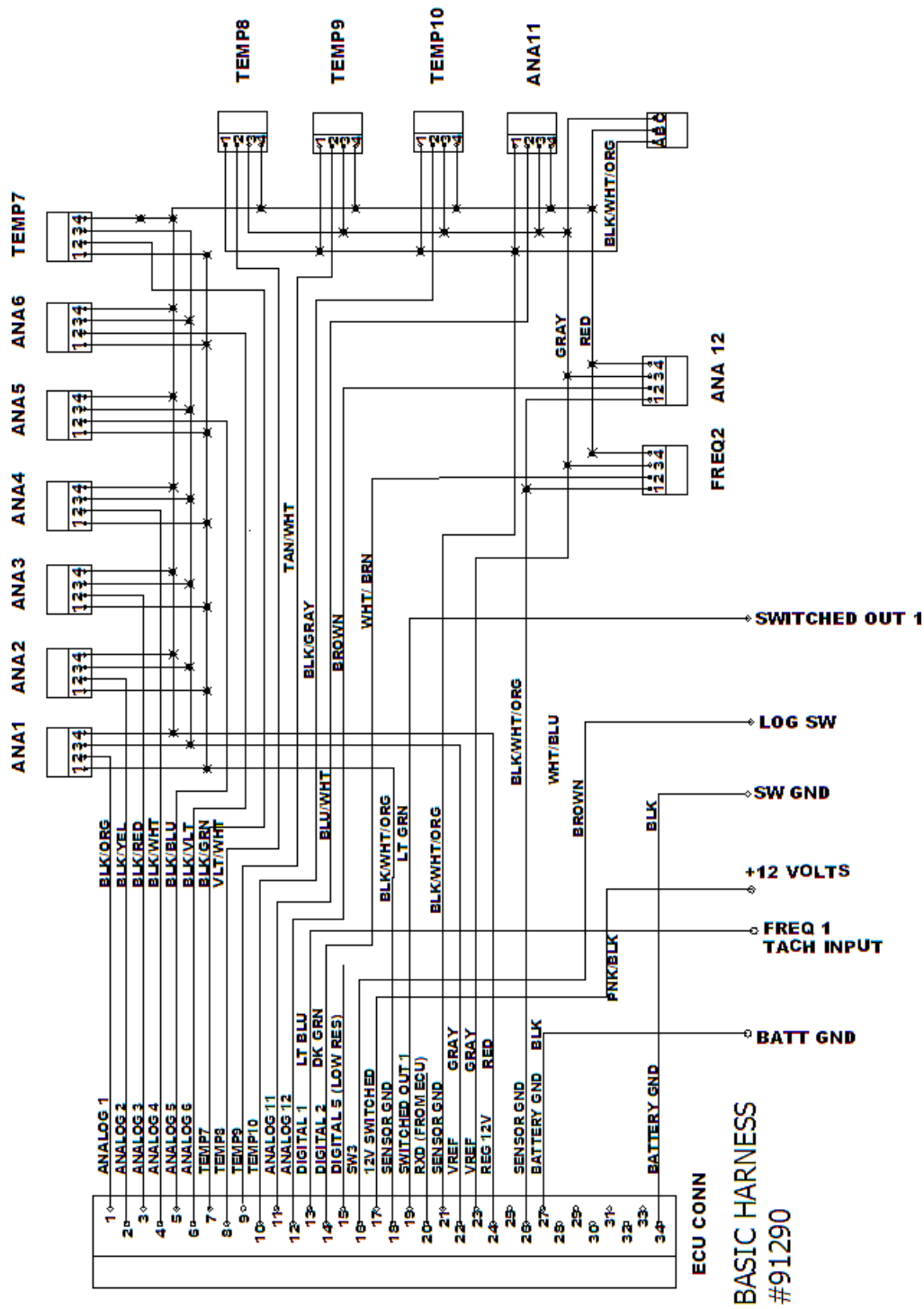
Suggested Harness Routing



#91290 Basic Analog Harness Details



#91290 Basic Harness Schematic



#91290 Basic Analog Harness LCU Connector pin assignments

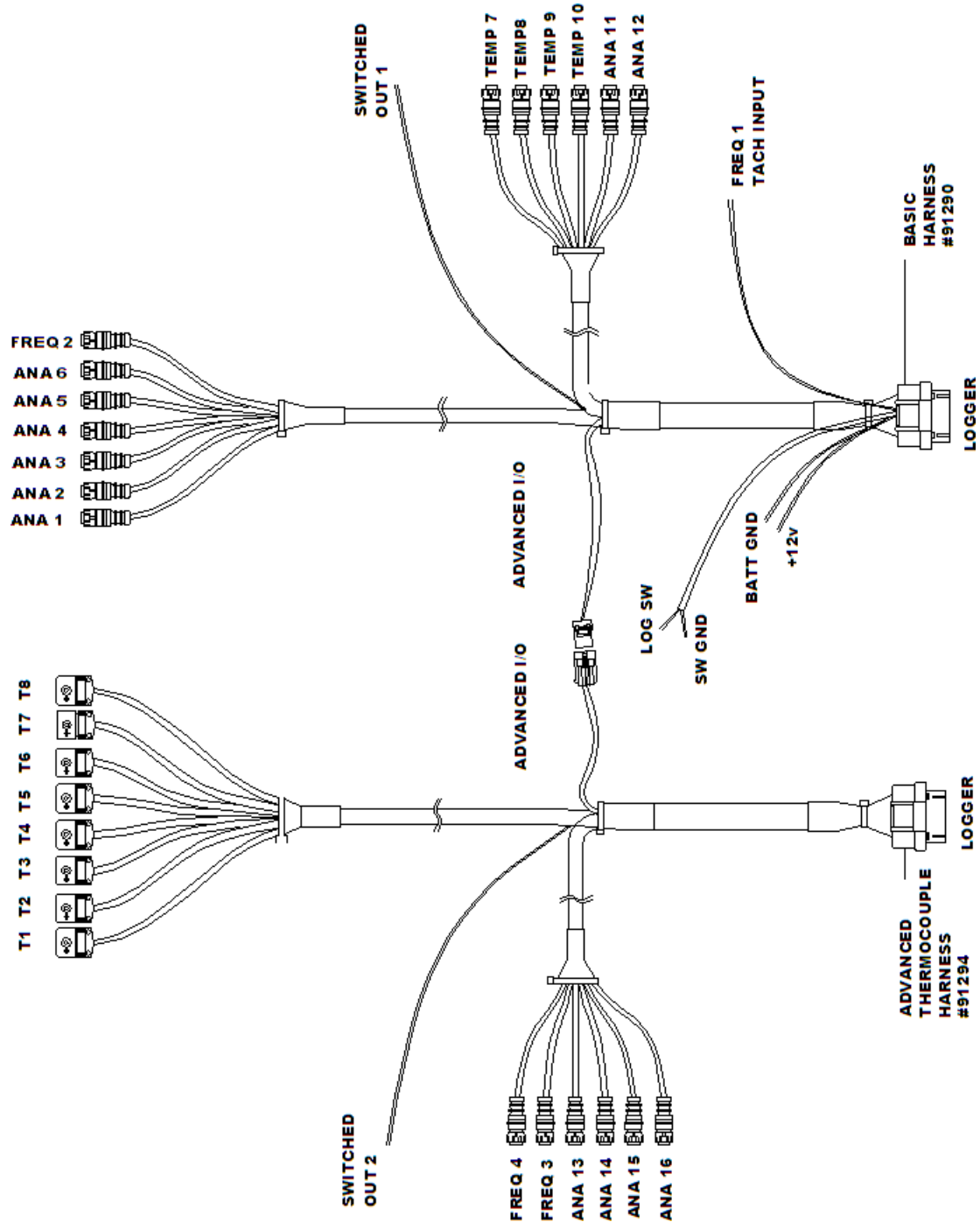
34 Pin LCU Connector

| PIN | WIRE COLOR | FUNCTION (Ch I.D) | PIN | WIRE COLOR | FUNCTION |
|-----|------------|------------------------------|-----|-------------|----------------|
| 1 | BLK/ORG | ANALOG 1 (0004) | 18 | BLK/WHT/ORG | SENSOR GND |
| 2 | BLK/YEL | ANALOG 2 (0005) | 19 | LT GRN | SWITCHED OUT 1 |
| 3 | BLK/RED | ANALOG 3 (0006) | 20 | N/C | RXD(FROM ECU |
| 4 | BLK/WHT | ANALOG 4 (0007) | 21 | BLK/WHT/ORG | SENSOR GND |
| 5 | BLK/BLU | ANALOG 5 (0008) | 22 | GRAY | VREF |
| 6 | BLK/VLT | ANALOG 6 (0009) | 23 | GRAY | VREF |
| 7 | BLK/GRN | TEMP 7 (0010) | 24 | RED | REG 12V |
| 8 | VLT/WHT | TEMP 8 (0011) | 25 | N/C | TXD(TO DASH) |
| 9 | TAN/WHT | TEMP 9 (0012) | 26 | BLK/WHT/ORG | SENSOR GND |
| 10 | BLK/GRAY | TEMP 10 (0013) | 27 | BLK | BATTERY GND |
| 11 | WHT/BLU | ANALOG 11 (0014) | 28 | N/C | |
| 12 | BROWN | ANALOG 12 (0015) | 29 | N/C | |
| 13 | LT BLU | FREQ 1 (0064) (TACH INPUT) | 30 | N/C | |
| 14 | DK GRN | FREQ 2 (0065) | 31 | N/C | |
| 15 | N/C | FREQ 5 (0068) LOW RESOLUTION | 32 | N/C | |
| 16 | BROWN | SW 3 | 33 | N/C | |
| 17 | PNK/BLK | 12V SWITCHED | 34 | BLK | BATTERY GND |

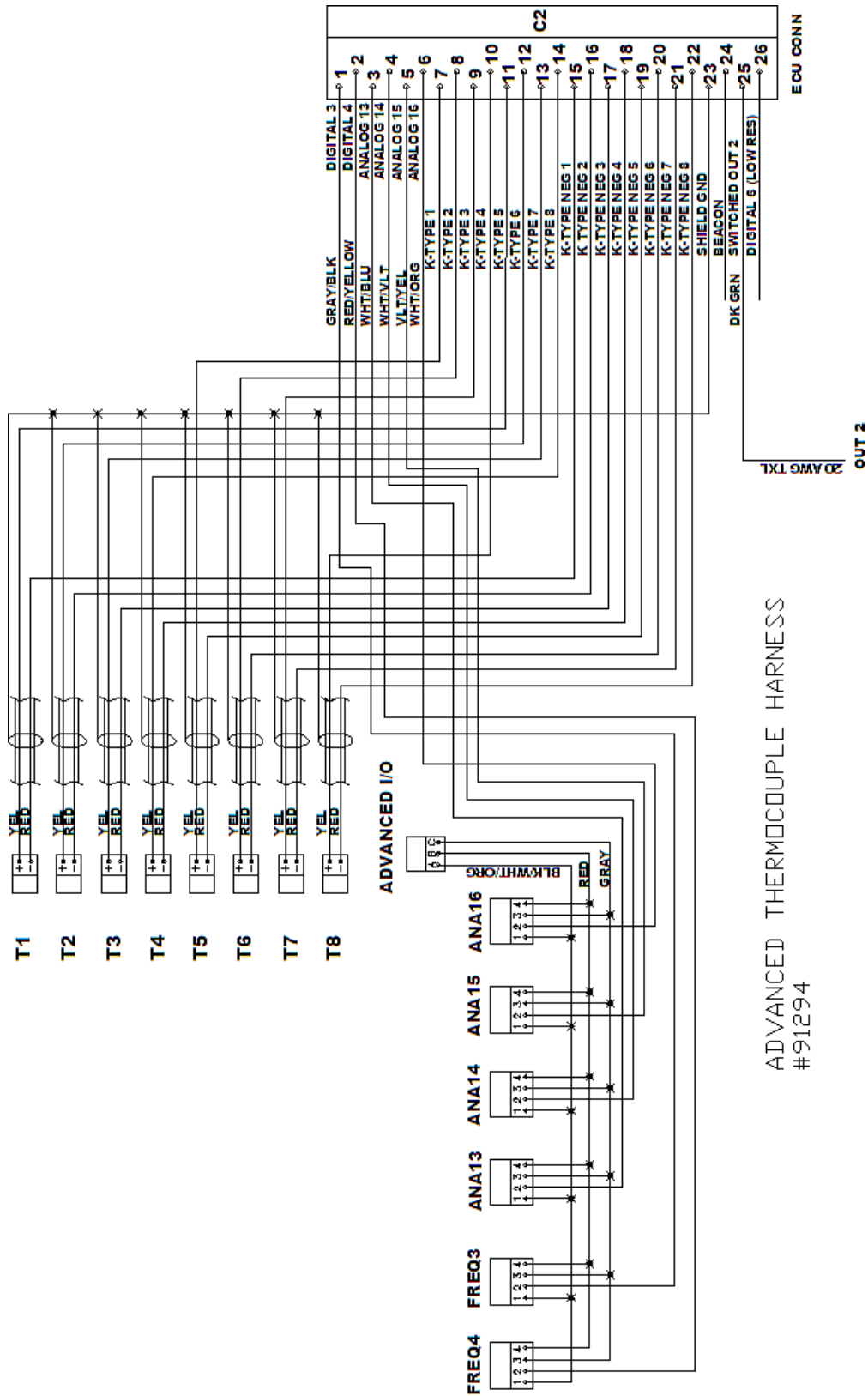
#91290 Basic Analog Harness parts and vendor details

| QTY | DESCRIPTION | MANUFACTURER | MANUFACTURER PART NUMBER |
|-----|--|--------------|--------------------------|
| 1 | 34 POSITION SUPER SEAL HOUSING | AMP | 2-1437285-3 |
| 26 | SOCKET TERMINAL, SUPER SEAL | AMP | 3-1447221-5 |
| 1 | HOUSING, METRI-PACK 150 SERIES | DELPHI | 12110293 |
| 3 | TERMINAL, FEMALE METRI-PACK 150 SERIES | DELPHI | 12084200 |
| 3 | CABLE SEAL, METRI-PACK 150 SERIES | DELPHI | 12048087 |
| 1 | TPA, METRI-PACK 150 SERIES | DELPHI | 12052845 |
| 1 | HOUSING, METRI-PACK 150 SERIES | DELPHI | 12129615 |
| 3 | CAVITY PLUG, METRI-PACK 150 SERIES | DELPHI | 12059168 |
| 1 | TPA, METRI-PACK 150 SERIES | DELPHI | 12052845 |
| 13 | EN3 MINI WEATHERTIGHT CONNECTOR | SWITCHCRAFT | EN3C4FC |

#91294 Advanced Thermocouple Harness Details



#91294 Advanced Thermocouple Harness Schematic



#91294 Advanced Thermocouple Harness LCU Connector pin assignments

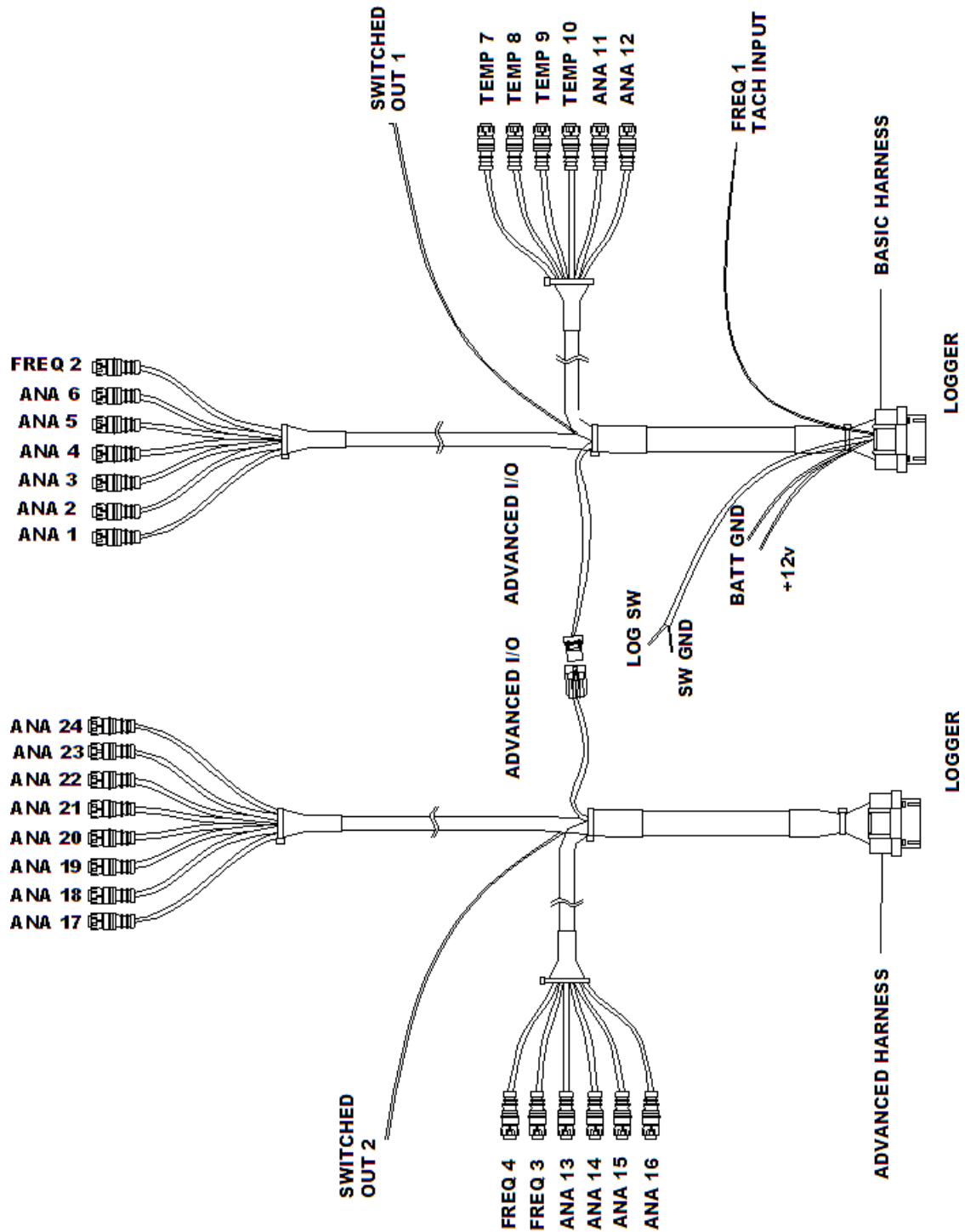
26 Pin LCU Connector

| PIN | WIRE COLOR | FUNCTION (Ch I.D) | PIN | WIRE COLOR | FUNCTION (Ch I.D) |
|-----|------------|-------------------|-----|------------|------------------------------------|
| 1 | GRY/BLK | FREQ 3 (0066) | 14 | YEL | K-TYPE 8 (I.D0059) |
| 2 | RED/YLW | FREQ 4 (0067) | 15 | RED | K-TYPE NEG 1 |
| 3 | WHT/BLU | ANALOG 13 (0016) | 16 | RED | K-TYPE NEG 2 |
| 4 | WHT/VLT | ANALOG 14 (0017) | 17 | RED | K-TYPE NEG 3 |
| 5 | VLT/YEL | ANALOG 15 (0050) | 18 | RED | K-TYPE NEG 4 |
| 6 | WHT/ORG | ANALOG 16 (0051) | 19 | RED | K-TYPE NEG 5 |
| 7 | YEL | K-TYPE 1 (0052) | 20 | RED | K-TYPE NEG 6 |
| 8 | YEL | K-TYPE 2 (0053) | 21 | RED | K-TYPE NEG 7 |
| 9 | YEL | K-TYPE 3 (0054) | 22 | RED | K-TYPE NEG 8 |
| 10 | YEL | K-TYPE 4 (0055) | 23 | BLK | K-TYPE SHIELDS GRND |
| 11 | YEL | K-TYPE 5 (0056) | 24 | N/C | |
| 12 | YEL | K-TYPE 6 (0057) | 25 | DK GRN | SWITCHED OUT 2 |
| 13 | YEL | K-TYPE 7 (0058) | 26 | N/C | FREQ 6 (I.D0069) LOW RESOLUTION |

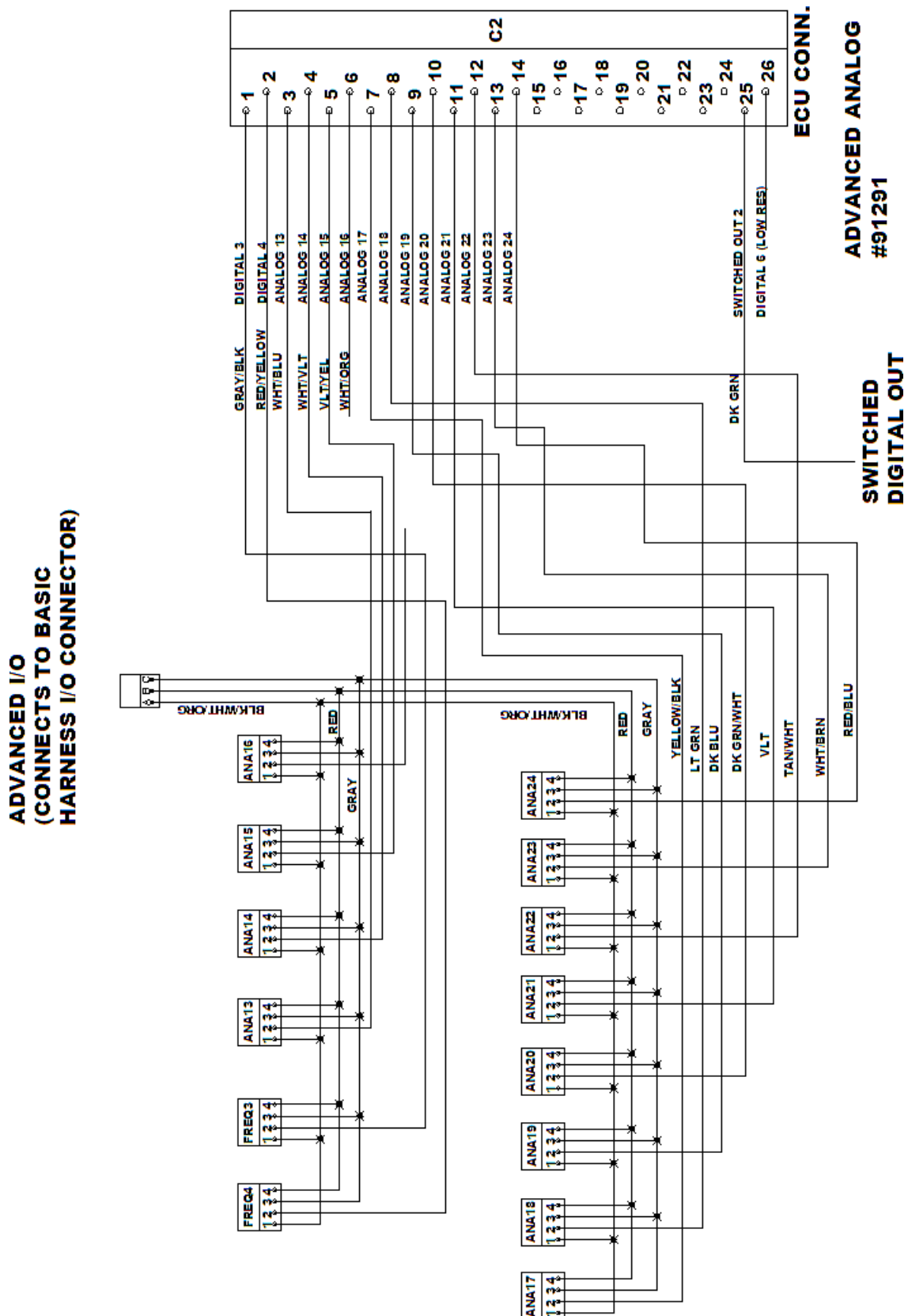
#91294 Advanced Thermocouple Harness parts and vendor details

| QTY | DESCRIPTION | MANUFACTURER | MANUFACTURER PART NUMBER |
|-----|--------------------------------------|--------------|-----------------------------|
| 1 | 26 POSITION SUPER SEAL HOUSING | AMP | 2-1437285-2 |
| 25 | SOCKET TERMINAL, SUPER SEAL | AMP | 3-1447221-5 |
| 1 | HOUSING, METRI-PACK 150 SERIES | DELPHI | 12129615 |
| 3 | TERMINAL, MALE METRI-PACK 150 SERIES | DELPHI | 12077628 |
| 3 | CABLE SEAL, METRI-PACK 150 SERIES | DELPHI | 12048087 |
| 1 | TPA, METRI-PACK 150 SERIES | DELPHI | 12052845 |
| 8 | SUBMINI CONNECTOR ALLOY CODE K | OMEGA | SMPW-K-F |
| 6 | EN3 MINI WEATHERTIGHT CONNECTOR | SWITCHCRAFT | EN3C4FC |

#91291 Advanced Analog Harness Details



#91291 Advanced Analog Harness Schematic



#91291 Advanced Analog Harness LCU Connector pin assignments

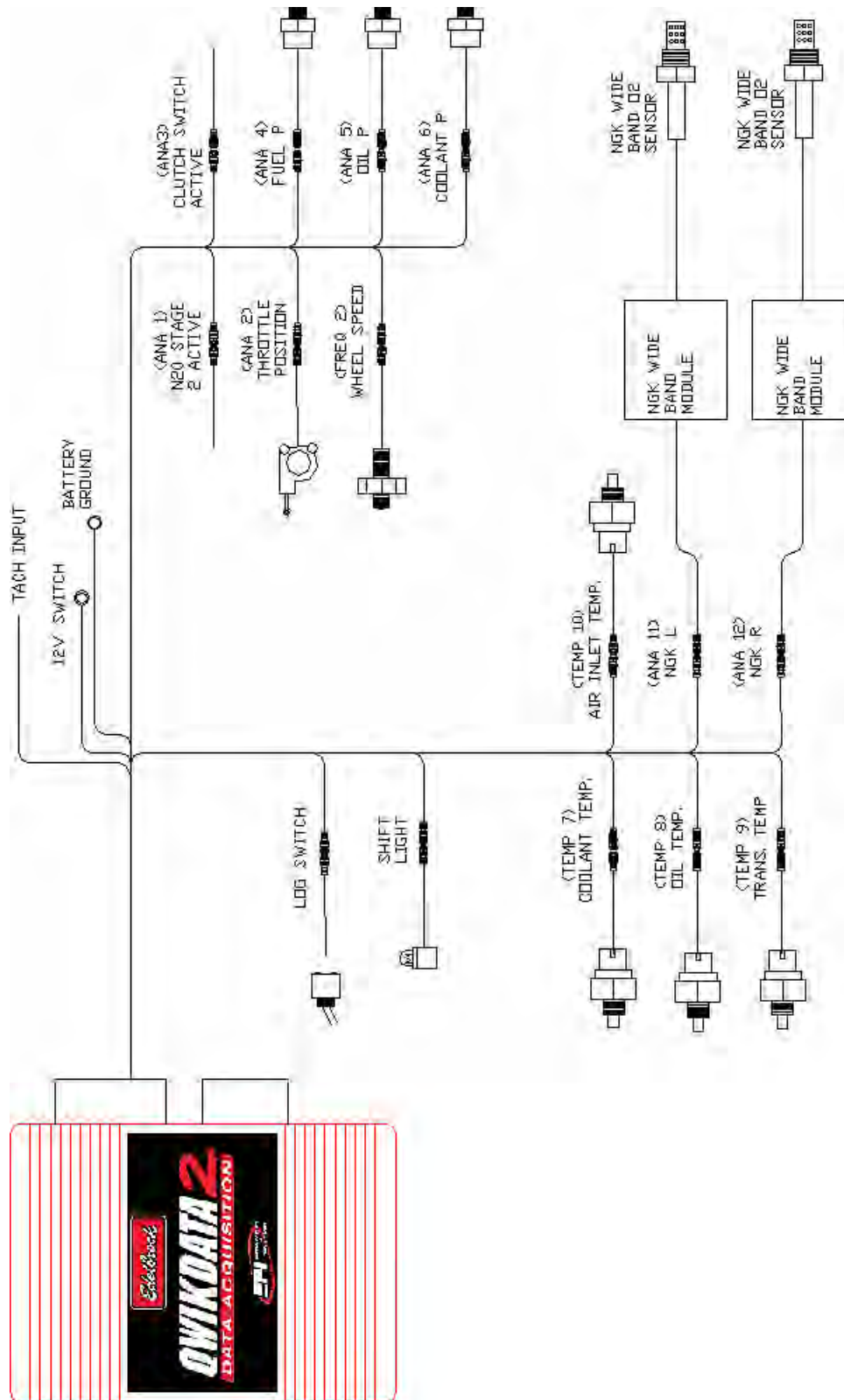
26 Pin LCU Connector

| PIN | WIRE COLOR | FUNCTION (Ch I.D) | PIN | WIRE COLOR | FUNCTION (Ch I.D) |
|-----|------------|---------------------|-----|------------|------------------------------------|
| 1 | GRY/BLK | FREQ 3 (I.D0066) | 14 | RED/BLU | ANALOG 24 or CARD (I.D0059) |
| 2 | RED/YLW | FREQ 4 (I.D0067) | 15 | N/C | |
| 3 | WHT/BLU | ANALOG 13 (I.D0016) | 16 | N/C | |
| 4 | WHT/VLT | ANALOG 14 (I.D0017) | 17 | N/C | |
| 5 | VLT/YEL | ANALOG 15 (I.D0050) | 18 | N/C | |
| 6 | WHT/ORG | ANALOG 16 (I.D0051) | 19 | N/C | |
| 7 | LYLW/BLK | ANALOG 17 (I.D0052) | 20 | N/C | |
| 8 | LT GRN | ANALOG 18 (I.D0053) | 21 | N/C | |
| 9 | DK BLU | ANALOG 19 (I.D0054) | 22 | N/C | |
| 10 | DK GRN/WHT | ANALOG 20 (I.D0055) | 23 | N/C | |
| 11 | VLT | ANALOG 21 (I.D0056) | 24 | N/C | |
| 12 | TAN/WHT | ANALOG 22 (I.D0057) | 25 | DK GRN | SWITCHED OUT 2 |
| 13 | WHT/BRN | ANALOG 23 (I.D0058) | 26 | N/C | FREQ 6 (I.D0069) LOW RESOLUTION |

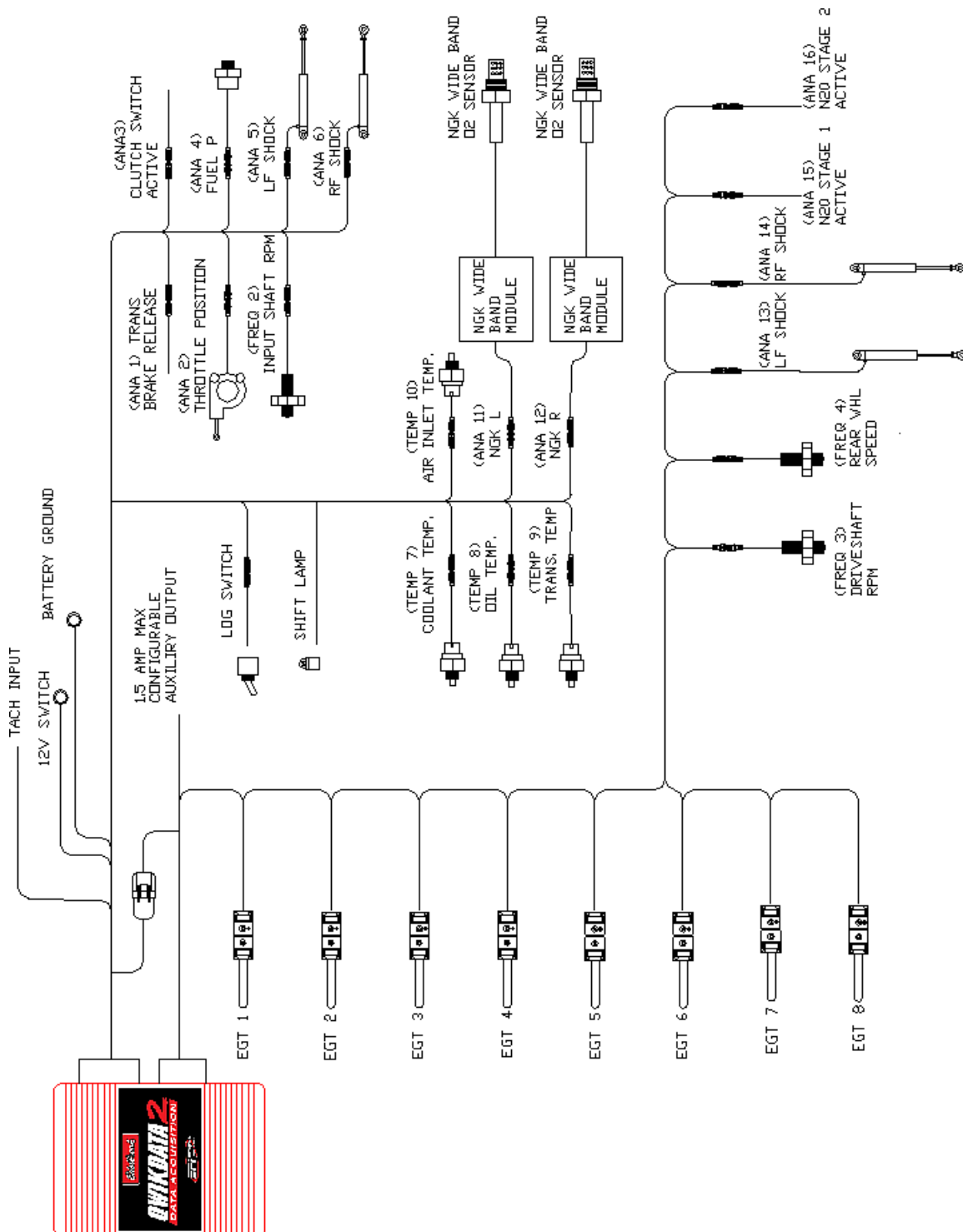
#91291 Advanced Analog Harness parts and vendor details

| QTY | DESCRIPTION | MANUFACTURER | MANUFACTURER PART NUMBER |
|-----|--------------------------------------|--------------|--------------------------|
| 1 | 26 POSITION SUPER SEAL HOUSING | AMP | 2-1437285-2 |
| 16 | SOCKET TERMINAL, SUPER SEAL | AMP | 3-1447221-5 |
| 1 | HOUSING, METRI-PACK 150 SERIES | DELPHI | 12129615 |
| 3 | TERMINAL, MALE METRI-PACK 150 SERIES | DELPHI | 12077628 |
| 3 | CABLE SEAL, METRI-PACK 150 SERIES | DELPHI | 12048087 |
| 1 | TPA, METRI-PACK 150 SERIES | DELPHI | 12052845 |
| 14 | EN3 MINI WEATHERTIGHT CONNECTOR | SWITCHCRAFT | EN3C4FC |

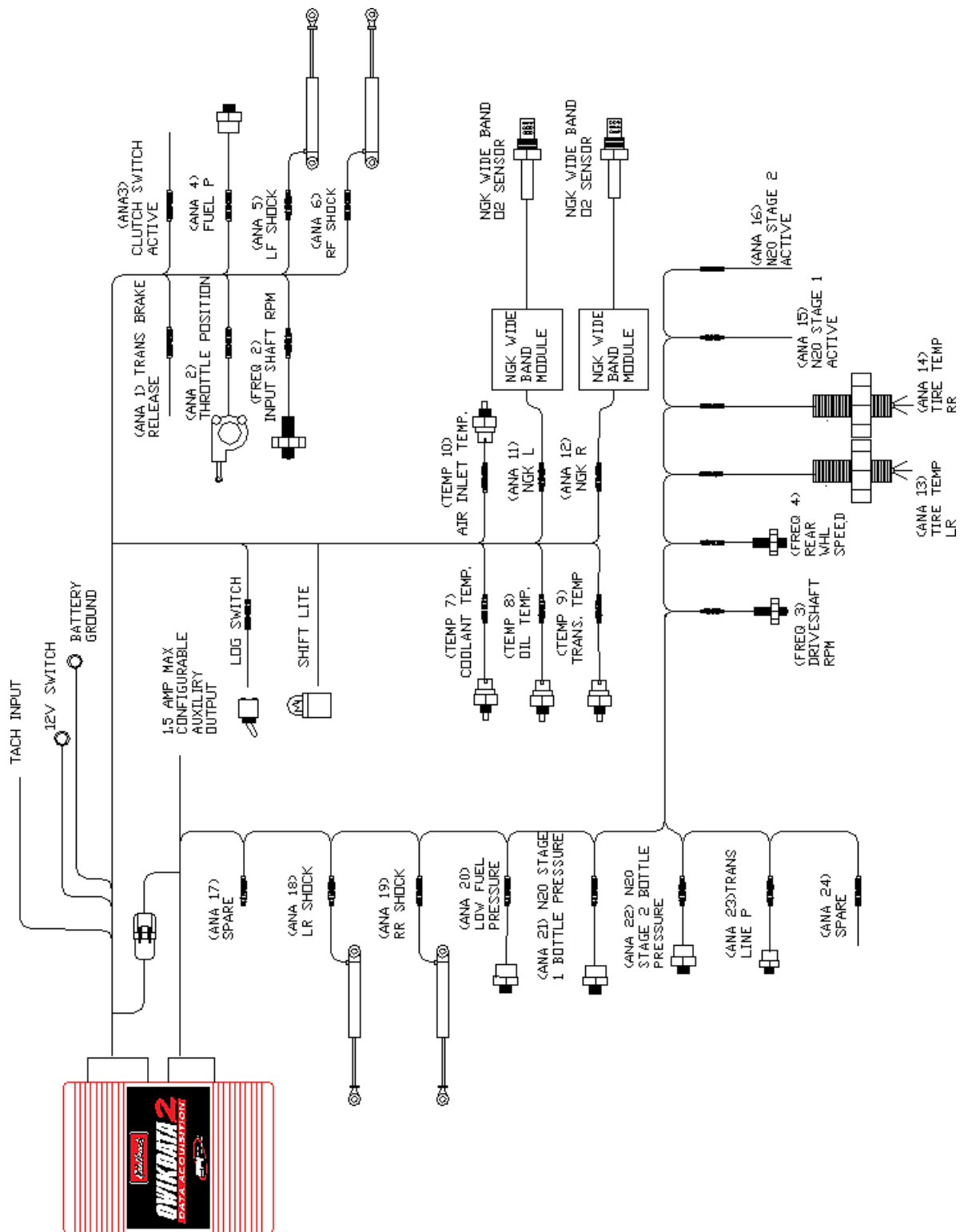
Basic System Example



Advanced Thermocouple System Example



Advanced Analog System Example



Instrumentation

All sensors output a voltage that represents a particular measurement; for example a linear potentiometer has a measurement range of 0-100mm and over this range its output is 0-5 volts.

The logger cannot store these voltages directly, so it converts them into digital information, a process known as analog to digital conversion (ADC). The logger looks at the voltage from the sensor at regular intervals, known as the logging rate, and converts the voltage into a binary number or counts (BITS).

When data is downloaded from the logger it creates a file known as a dataset. The dataset contains all of the samples for every channel that was logged. The computer uses the channel calibrations to convert this data into recognized units; for example, inches, deg C/F or psi etc.

Wiring information for different sensor types is given in the following pages.

Sensor wiring notes:

- Sensor ground is connected to all sensors and is used as a zero reference
- Sensor power +5V is connected to various sensors as required and is used as a voltage reference.
- +12V is connected to various sensors as required and is used as a source voltage.
- Signal+ and Digital Signal is the sensors 0 to 5 volt signal output to the LCU.

Notes:

- QwikData 2 harness analog sensor connector part number is (switchcraft EN3C4MC)
- QwikData 2 is compatible with first generation QwikData sensors.
- Refer to the QwikData 2 section of the Edelbrock website for a complete listing of QwikData 2 accessories, part numbers and available sensors.
- For more detailed information please refer to the QwikData 2 Installation Manual included with your kit or refer to Help on the toolbar of your QwikData 2 software.

Exhaust Gas Temperature Sensors

The exhaust gas temperature (EGT) thermocouples are typically mounted in each of the exhaust header pipes close to the header flange (usually about 3" away). The exact location is not critical but you should try to mount all the EGTs at approximately the same location in each header for consistent measurements. The EGT thermocouples are supplied with a compression fitting similar to the general purpose thermocouples. The compression fitting consists of four parts; a bung, an adapter, a ferrule, and a compression nut. To install the EGT thermocouples, you need to drill a 9/16" clearance hole in the exhaust header and then weld the bung into the header.

Note: The bung is threaded with a 1/8" NPT and MUST be mounted with the inside taper facing out.

Once the bung has been welded in place, thread the adapter into the bung and tighten. Place the ferrule into the adapter and loosely thread the compression nut onto the adapter. Insert the EGT thermocouple into the compression fitting and tighten the compression nut to secure the thermocouple. Insert the EGT thermocouple into the compression fitting until the tip is approximately in the center of the header. Secure by tightening the compression nut.

Wheel / Shaft Speed Sensors

These sensors can be used to measure either wheel speed or shaft speeds. They are supplied with two rare earth magnets and a sensor pickup. The two magnets are mounted equally spaced around the rotating object (wheel or shaft) and the pickup is mounted on a stationary object. For proper operation, the magnets must pass within a maximum of 1/4 inch of the pickup. Because of this restriction, it is very important to mount the pickup on something that moves very little relative to the magnets. For example, if the magnets are mounted on the drive shaft, they should be either mounted close to the transmission end or close to the final drive, and the pickup should be mounted directly to the transmission or the final drive respectively. Similarly, if the magnets are mounted to a wheel, the pickup must be mounted to a suspension piece that moves with the wheel. The magnets can be epoxied in place.

Driveshaft sensor kits including sensor mount and driveshaft collar are available from Edelbrock.

- Reed Switch Speed Sensor #91116 purchased before Sept.09 require a .33uF capacitor be soldered across the signal and ground wires inside the Switchcraft sensor connector.

Calibrations

A calibration is a mathematical equation that can be applied to a sensors output to convert it into engineering units. The calibration tools of QwikData 2 let you:

- enter a known calibration curve for an analog sensor.
- apply gain and offset calibration functions.
- choose mathematical equations that describe the behaviour of the sensor.

When you choose to graph a channel using the Analysis program the calibration is attached to the raw sensor data and converts it to engineering units.

Channel Types

There are four types of channels defined:

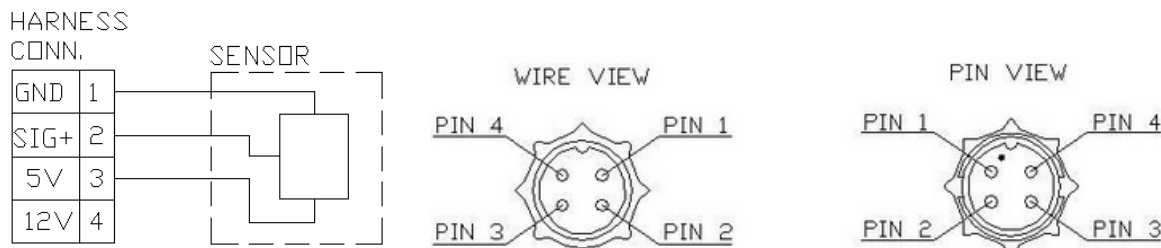
- physical analog sensor channels
- internal system channels
- digital channels
- data stream channels

Each channel is defined by a set of parameters that the logger uses to allocate memory space in the logging table. A hardware index is used to refer to the physical connection between each sensor and the logger. Each analog or digital channel connects to the logger through its connector in the LCU harness..

Data stream channels such as those received by a communication link to an ECU connected to the logger via a communications port. These channels do not have physical location but have a hardware index which is defined by the database generated for each manufacturers ECU.

Connecting a Pressure Transducer

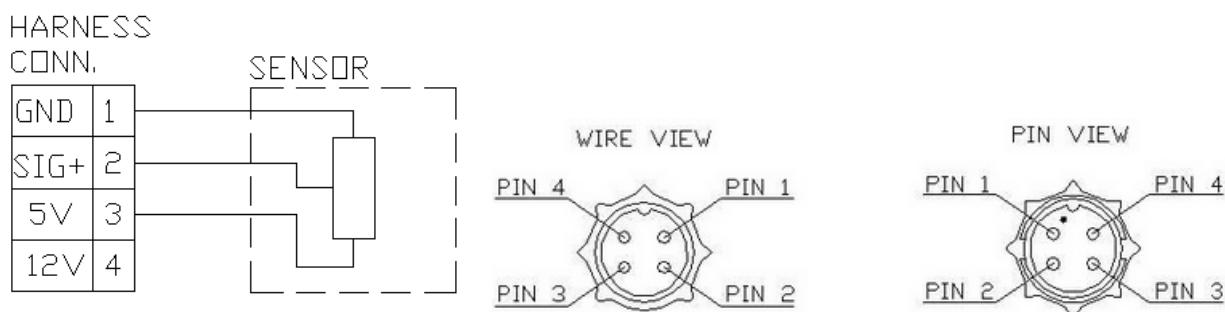
Connect 0-5volt output sensor (e.g. pressure transducer) to a analog input as shown below. Use Either the 5v or 12v excitation voltage as recommended by the sensor manufacturer. **5v excitation shown below.**



NOTE: Only 0-5 Volt signals can be used. No 0-10 Volt or 0-12 Volt.

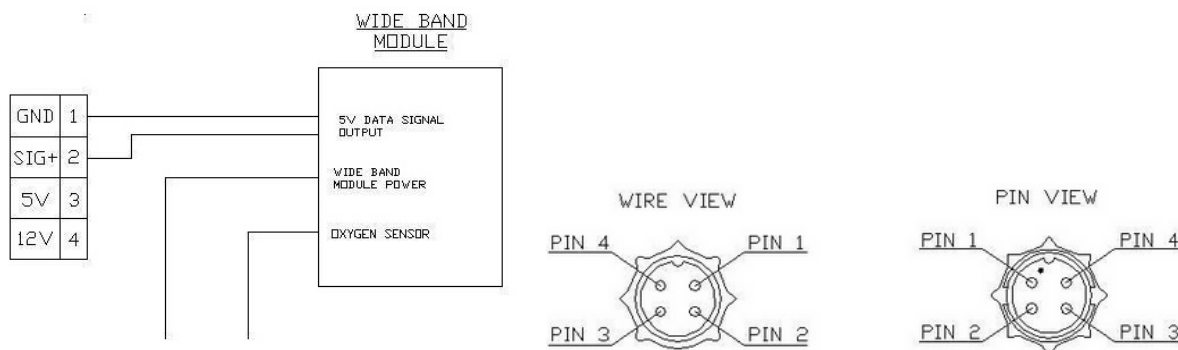
Connecting a Potentiometer

Connect a potentiometer sensor to a analog input as shown below.



Connecting a Wide Band Lambda Sensor

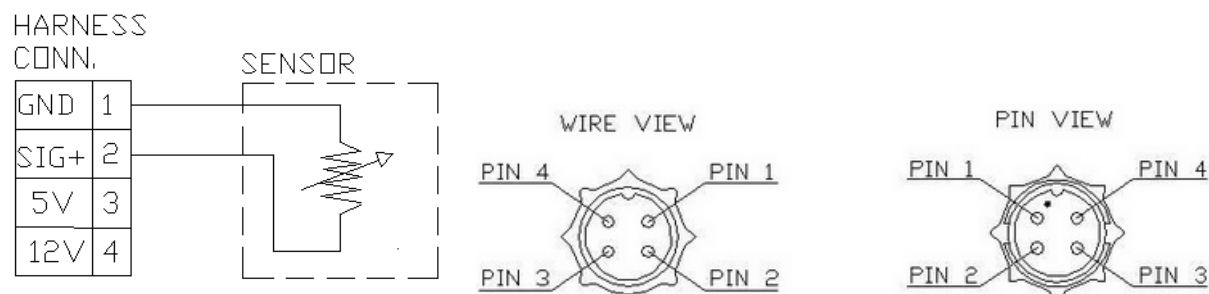
Most Wideband controllers have an analog output signal (0-5v) used for data logging or connecting to an engine management system. Connect this wire to pin #2 of the Analog Connector for the channel you are configuring. If a output signal ground is supplied follow manufacturers installation instructions.



Connecting a Thermistor Sensor

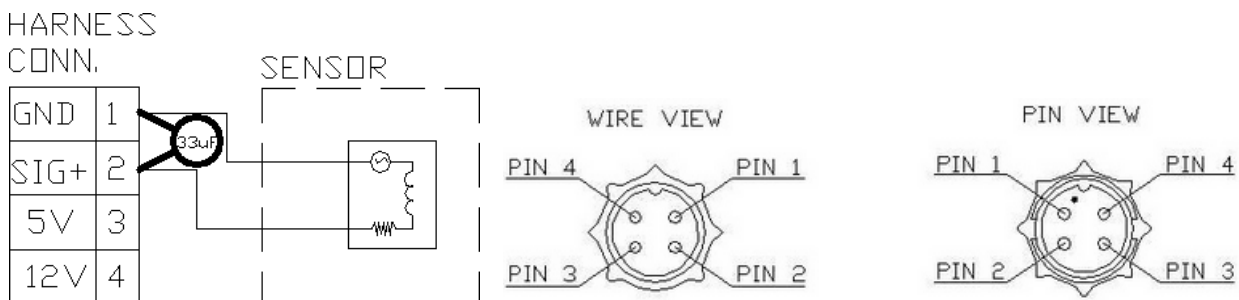
Connect a RTD Thermistor sensor to an analog input as shown below.

- Channels #7,8,9, and 10 are configured for Thermistor Temperature Sensor inputs.



Connecting a Reed Switch Speed Sensor

Connect Wheel/Shaft Speed Sensor #91116 as shown below.



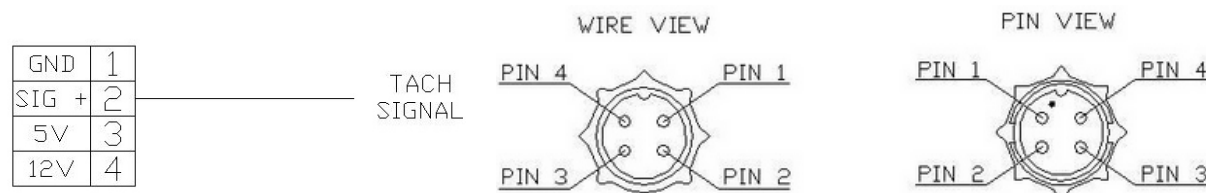
- Reed Switch Speed Sensor #91116 purchased before Sept.09 require a .33uF capacitor be soldered across the signal and ground wires inside the Switchcraft sensor connector.

Note: QwikData 2 only accepts Reed Switch Speed Sensors or Hall Effect Type Speed Sensors.

Connecting a Tach Input

Digital Channel inputs can be configured to receive a tach signal for a RPM input. Most electronic ignitions provide a tach output. This wire should be connected to the Tach Input wire(Digital 1) on your Basic Harness.

WARNING!!!: THIS INPUT **MUST NOT** BE CONNECTED DIRECTLY TO THE IGNITION COIL.



Pre Outing Check-List

Use the following information when preparing your race car for a event to help verify your car is properly setup for each session.

1. Open the [Configuration](#) program
2. [Set Current Car](#) for setup. (ex. Car 01)
3. [Register LCU](#). Specify Car Setup file and download path.
4. [Calibrate sensors](#) as necessary if any sensor changes have been made.
5. Verify [Logging Table](#) settings, channels for logging, channel sample rates and enable criteria.
6. Update [Outing data](#) file with driver and comments information.
7. Update [Setup Sheet](#) sheet.
8. Open [USB Communication](#) program.
9. [Open a Template](#) (**.nsb) if the preferred channel monitoring screen is not displayed.
10. Update [Session Data](#) information.
11. [Send Config](#) to Logger.
12. [Zero selected Channels](#) if necessary.
13. Verify sensor functions and channel values.
14. Manually [Start Logger](#) from Syscon option and log sample data to test setup.
15. Stop data logging and [Download](#) sample data file.
16. Open [Data Analysis](#) program.
17. Select [Replace Outing](#) and verify logged data.

QwikData 2 Tech Support

For further information, Technical support, updates and free downloads please see the Edelbrock web site and

QwikData 2 Support Forum:

Edelbrock Toll-Free Tech Line: 800-416 8628
7am-5pm PST, Monday-Friday

Web site:
Edelbrock.com - Automotive - Data Acquisition- QwikData 2

Edelbrock Forum: [QwikData 2](#)

Edelbrock Corporation
2700 California St
Torrance CA. 90503

User Notes

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DATA ACQUISITION



www.edelbrock.com

Edelbrock Corporation
Torrance, California 90503
USA

For more information in print or on CD call: 1-800-FUN-TEAM or go to website

Factory Tech Line: 1-800-416-8628 from 7am-5pm PST, Monday-Friday

Headquarters: 1-310-781-2222 from 8am-5pm PST, Monday-Friday

Tech support: QD@edelbrock.com