

**ULTRA DASH XTREME**

**Racepak**

**Ultra Dash**

Installation and Operation Instructions

250-DS-LDX



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## Introduction

This manual contains the information required to install and program your Ultra Dash.

### **LDX Features**

- Engine RPM
- Drive shaft RPM
- Oil pressure
- Water temperature.
- External warning indicator output.
- Internal warning indicator light.
- Six gear shift light output.
- V-Net port for expansion of up to 32 additional channels.
- Minimum and Maximum recall.
- Electro luminescent(EL) back light.

### **Package Contents**

The Ultra Dash kit should contain the following components:

- 1 – LDX Dash Display
- 1 – 12 position connector and wires
- 1 – 15 position connector and wires
- 1 – Remote record/display switch
- 1 – Drive shaft sensor, collar and bracket
- 1 – Oil pressure sensor
- 1 – Water temperature sensor
- 1 – Wire terminal kit
- 1 – Instruction manual
- 1 – Cut out template

## Ultra Dash Installation

### Selecting a Mounting Location

Select a mounting location that does not expose the Ultra Dash to temperatures over 185° F. Also avoid exposing the front LCD to direct sunlight. Extreme overheating from the sun can temporarily cause the LCD to turn entirely black. Although the dash is water resistant (i.e. rain, snow), you should never submerge any part of the dash under water.

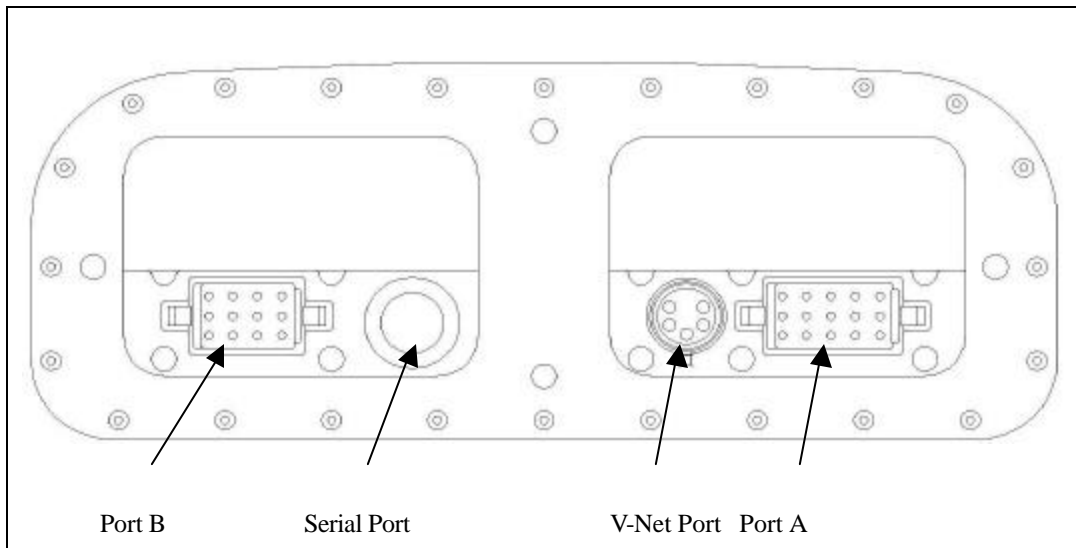
### Dash Mounting

Once you have decided on a mounting location use the supplied template to cut out the rear dash inserts and drill holes for the mounting studs.

Use the supplied machine nuts and locking washers to bolts in the dash. Do not use thread lock or nylock nuts on the mounting studs.

### Port Descriptions

#### Connector Locations



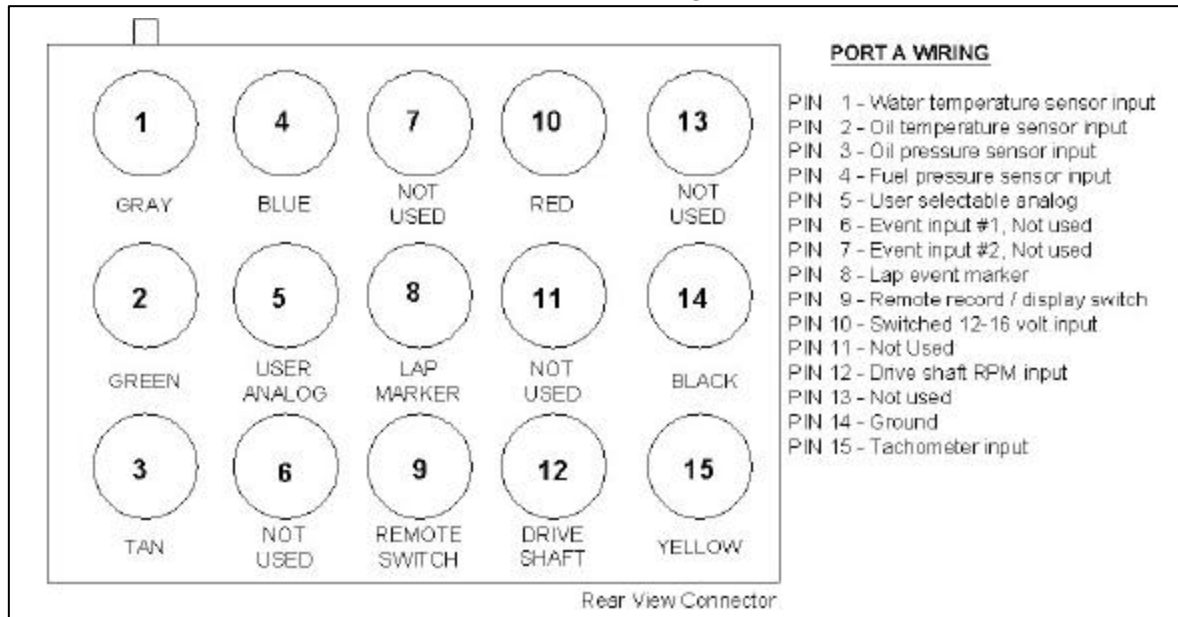
**Port A** --- Port A is used to connect the main power source and sensors. See the section **Port A Wiring** for complete instructions.

**Port B** --- Port B is used to connect the shift light and warning light outputs. See the section **Port B Wiring** for complete instructions.

**Serial Port** --- The serial port is used to program the dash and download data using the DataLink PC software.

**V-Net Port** --- The V-Net can be used to install up to 32 additional analog or digital inputs.

## Port A Wiring



Port A uses the 15 position connector. The only factory installed wires in the port A connector are the ones required for power and ground. All other wires are provided with the pins crimped and ready to install if needed. A description of each wire and its function is described below. If you decide not to use an input you may leave the wire uninstalled.

**Pin 1 (analog input #1) – Water temperature input** – Insert the gray wire in pin position 1. Connect the other end of the gray wire to water temperature sensor using the #10 ring terminal provided.

**Pin 2 (analog input #2)– Oil temperature input** -- Insert the green wire in pin position 2. Connect the other end of the green wire to oil temperature sensor using the #10 ring terminal provided. (optional)

**Pin 3 (analog input #3) – Oil pressure input** – Insert the Tan wire in pin position 3. Connect the other end of the tan wire to the oil pressure sending unit using the #10 ring terminal provided.

**Pin 4 (analog input #4) – Fuel pressure input** – Insert the blue wire in pin position 4. Connect the other end of the blue wire to the fuel pressure sending unit using the #10 ring terminal provided. (optional)

**Pin 5 (analog input #5)– User selectable analog input.** This input can be used with any of the analog sensor types. (i.e. temperature or pressure)

**Pin 6 and 7** – Digital Event Inputs 1-2.

**Pin 8 – Lap marker event** – This input can be used to get approximate lap times by pressing a switch each time the start/finish line is passed. (optional)

**Pin 9 – Remote record / display switch** – (optional) Insert the brown wire in pin position 9. Connect the other end of the brown wire to the record switch. This input is used to remotely change the dash display and start a recording by pressing a switch. (optional)

**Pin 10 – Power input** – Connect the red wire to a switched 12 – 16 volt power source.

**Pin 12 – Drive shaft RPM (Input #2)** – Insert the purple wire in pin position 12. See the Sensor Installation section for complete drive shaft sensor installation instructions.

**Pin 14 – Ground** – Connect the black wire to a solid chassis ground.

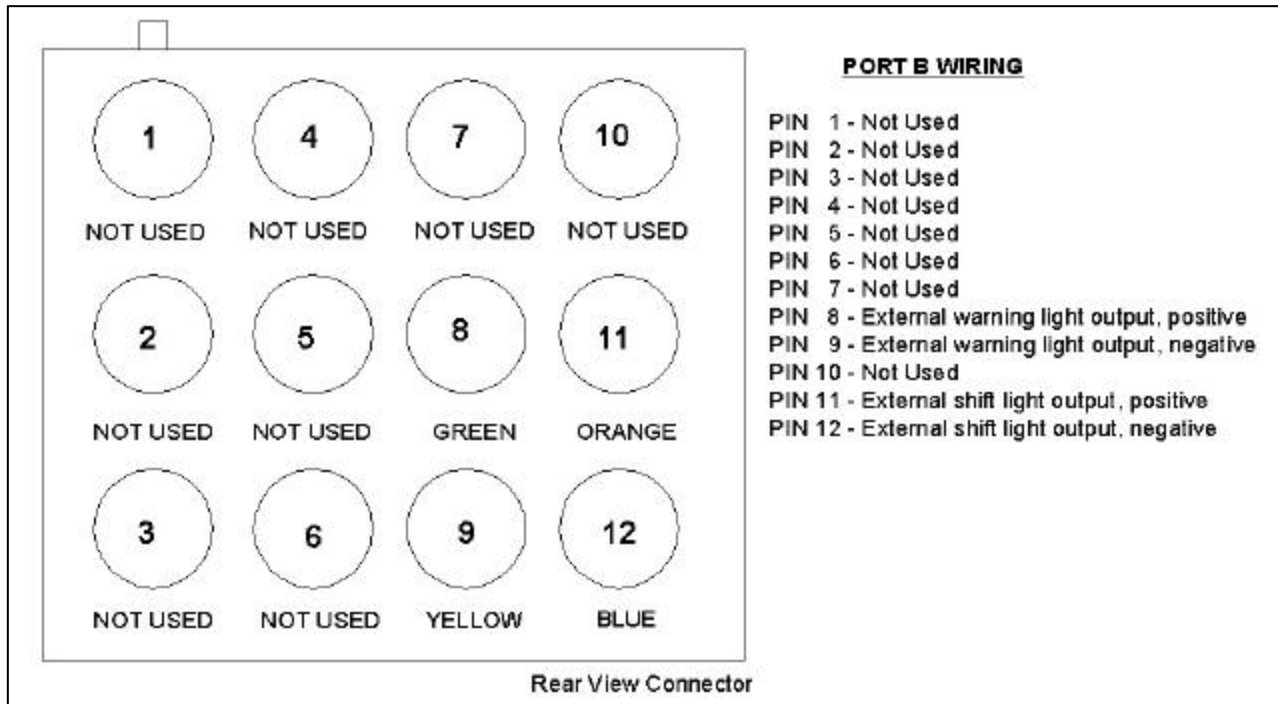
**Pin 15 – Engine RPM (Input #1)** – Insert the yellow wire in pin position 15. Connect the other end of the yellow wire to the tachometer signal output from your ignition box.

**Getting a Tachometer Signal with an MSD Magneto**

The tachometer input on pin 15 is designed to be used with a standard square wave tach signal. If you are using an MSD magneto you have two options.

- 1) If you are using an MSD Retard Box simply connect the yellow wire from pin 15 on the UDX to the tachometer output signal on the side of the Retard Box.
- 2) Purchase an MSD Tachometer Adaptor P/N: 8134. Connect the yellow wire from pin 15 on the UDX to the tachometer output on the MSD Tachometer Adaptor.

**Port B Wiring**



Port B uses the 12 position connector. Since all port B inputs are optional the wires are provided with the connector pins crimped but the wires are not installed in the connector. A description of each wire and its function is described below. If you decide not to use an input you may leave the wire uninstalled.

**Pin 8 – External warning light output - Positive**

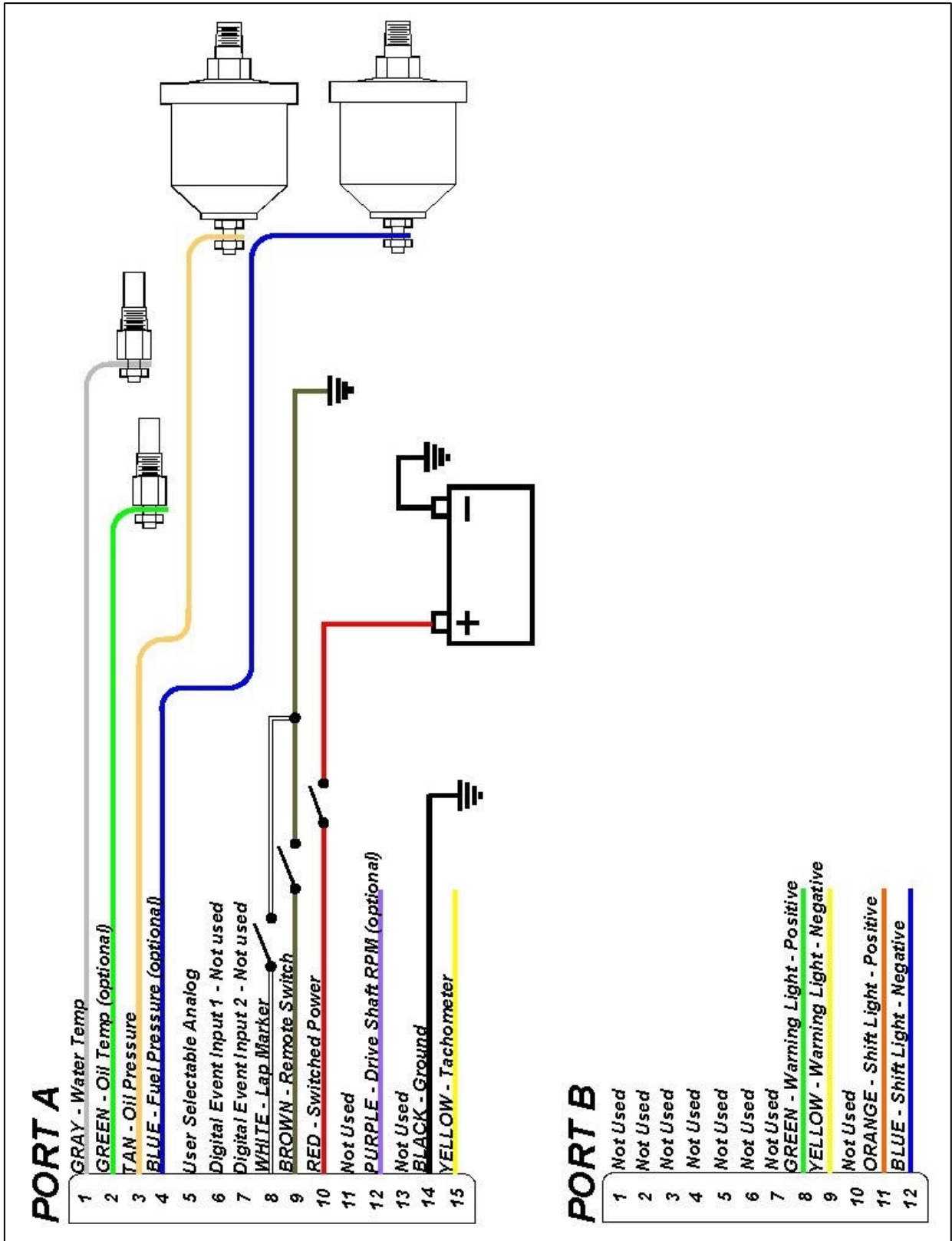
**Pin 9 – External warning light output - Negative**

**Pin 11 – Shift light output - Positive**

**Pin 12 – Shift light output - Negative**



Wiring Schematic



## Sensor Installation

### Water and Oil Temperature Sender Installation

The water and oil senders provided use 1/8" NPT thread. An adaptor may be required to accommodate larger thread sizes. Make sure to use thread sealer when installing the sender to prevent water and oil leaks.

### Pressure Sender Identification

Currently there are 3 different pressure sender ranges available. Each sender is identified by a marking on the hex fitting as listed below:

<b>Pressure Range</b>	15 PSI	60 PSI	100 PSI
<b>Marking</b>	16	60	42
<b>Sensor Type</b>	12	13	5

When installing pressure senders it is important to use the correct pressure range. For instance, you would not want to install a 15 psi sender in your oil pressure line. The dash is pre-configured at the factory to use a 15 psi sender for fuel pressure and a 100 psi sender for oil pressure. If you change pressure ranges you will need to reprogram the sender type in the dash setup. See "Setup mode" for details.

### Remote Record / Display Switch Installation

If you want to change displays or start a recording without having to reach the **REC** button on the dash you will need to install the remote record switch. Install the supplied push button switch in the desired location. Connect one side of the switch to chassis ground. Connect the other side of the switch to the brown wire on Pin 9--Port A.

### Lap Marker Switch

If you do not have a lap beacon and receiver system you can still get approximate lap times by manually pushing a button each time you cross the start/finish line. Install a normally open push button switch (not supplied) in the location easily accessible to the driver like the steering wheel. Connect one side of the switch to Pin 8 – Port A. Connect the other side of the switch to chassis ground.

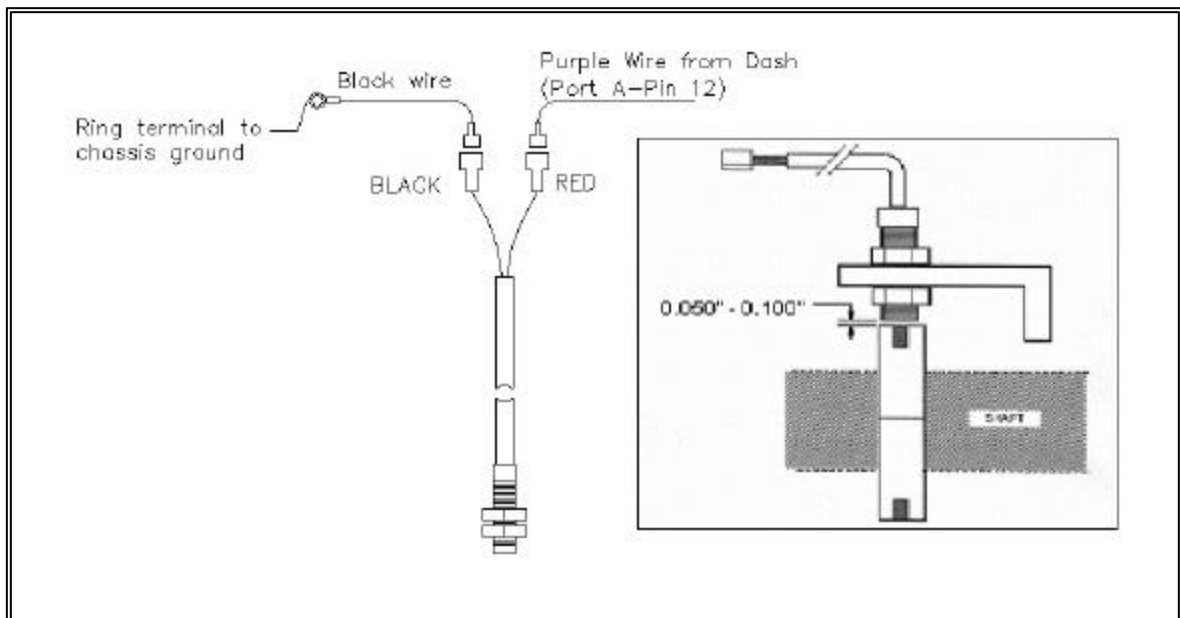
### Drive Shaft Sensor and Collar Installation

Normally the split collar is mounted on the pinion shaft/yoke. However, it can also be mounted on the transmission tail shaft/yoke. If your transmission and/or bell housing is removed frequently you should mount the collar on the pinion shaft/yoke to avoid possible damage to the sensor during clutch and/or transmission service.

After you have selected a location, position the split collar over the shaft and fix the collar onto the shaft by tightening the two bolts connecting the two collar halves. Make sure the collar is forward enough that it cannot rub on the pinion seal. Tighten the two bolts equally such that the gap on both sides of the split collar is equal. This will insure the magnets are 180 degrees apart.

Next secure the mount bracket and rpm sensor to the vehicle as shown below. The mount must be installed to a solid member of the vehicle that does not move relative to the placement of the split collar assembly. This will prevent contact between the sensor and the split collar. Insert the rpm sensor in the slotted hole in the mount bracket and position the rpm sensor such that the sensor is centered over the magnet in the split collar. Adjust the gap between the end of the rpm sensor and the split collar to .050" to .100". Secure the sensor by tightening the two jam nuts. Be careful not to over tighten the jam nut or you will break the sensor.

Connect the purple wire from the dash Port A harness to the red connector on the shaft sensor. Connect the shaft sensors black connector to chassis ground.



## Installing V-Net Channels

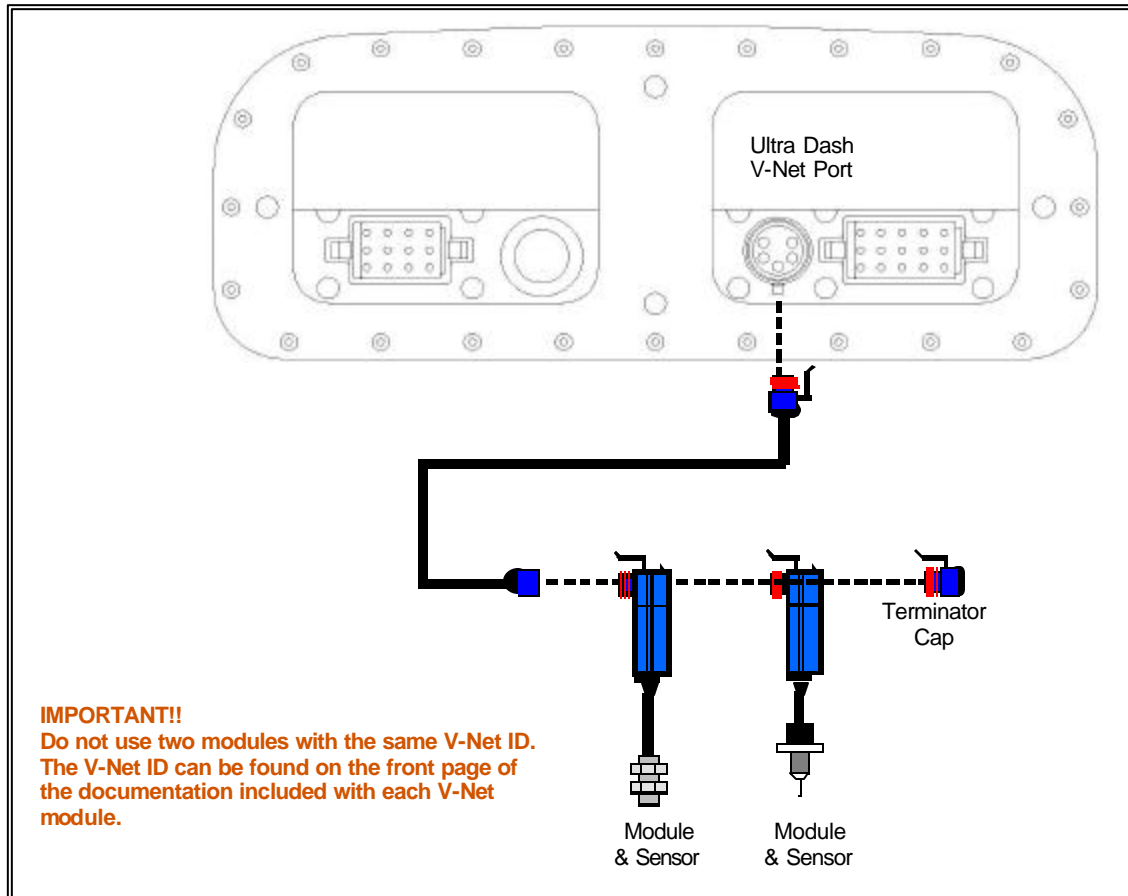
You can add up to 32 additional channels to your Ultra Dash by installing modules on the V-Net port. For instance, if you wanted to monitor exhaust gas temperatures (EGT) you would need to purchase additional V-Net modules. Follow the steps below to add V-Net modules to your Ultra Dash. If you are adding V-Net channels we recommend purchasing the PC programming software kit. This will allow you to program the dash to display the V-Net channels in any of the UDX display positions you prefer. Otherwise, the only way to view channels added to the V-Net is by using the “Scroll Mode” function which we will explain later in the manual.

**Step #1** — Unplug the factory installed terminator cap from the V-Net port on the back of the dash

**Step #2** — Plug the V-Net extension cable in the V-Net port.

**Step #3** — Plug the other end of the V-Net cable in to the first V-Net module. You can install up to 32 V-Net modules. You can plug the V-Net modules in any order that is convenient. The modules can be plugged directly in to each other or a V-Net extension cable can be used between modules if necessary.

**Step #4** — Plug the terminator cap removed in step #1 in to the last V-Net module.



## Programming and Operation

After installation the first thing you should do is configure the setup parameters. Although the factory defaults will work fine for most users, you should run through setup mode and make any needed adjustments. For instance, you may need to change the oil pressure warning level. There are two methods that can be used to configure the dash. The first method uses the buttons on the front of the dash. Using this method you can program the basic features required for most users. However, if you would like to reconfigure any of the factory default display positions you must use the second method, which is the DataLink PC software. We recommend using the DataLink PC software whenever possible.

### How the Buttons Work:

Each button can perform three different functions depending on how long the button is held down. In this manual we will refer to the three different button press types as SHORT, MED and LONG. To help determine when to release the button, and as a result the type of button press, you need to look at the warning indicators in the upper corners of the dash. If you release the button after one flash a SHORT button press will be entered. Releasing the button after two flashes will result in a MED button press and three flashes will result in a LONG button press. Table 1 list the three different button press types.

Table 1

Type	Warning Flashes	Time in Seconds
SHORT	1	Less than 2
MED	2	2
LONG	3	3 or more

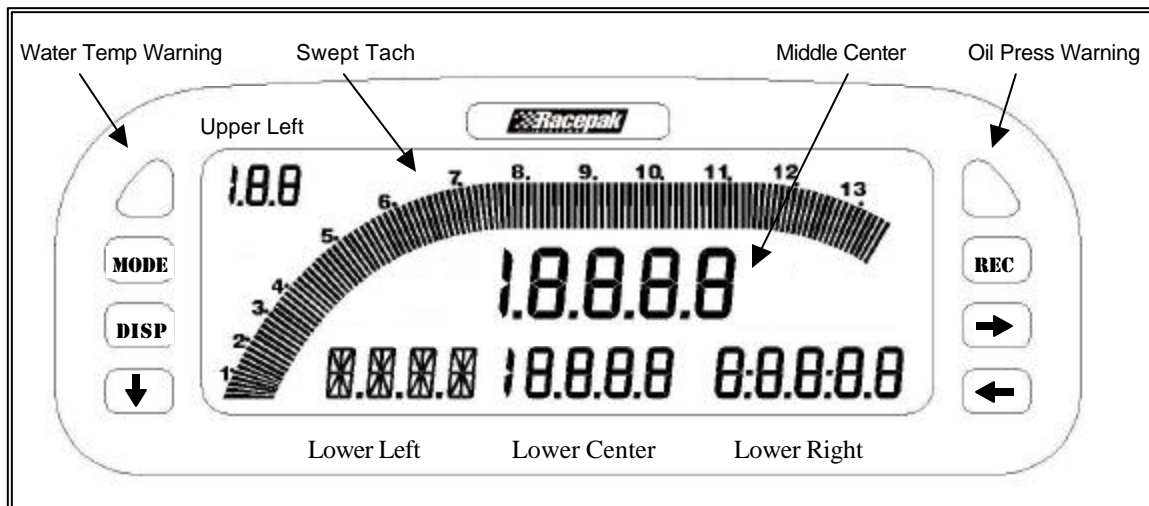


Figure 1

Figure 1 illustrates the channel positions and labels the terminology used in this manual to describe each position on the LCD display. There are six channel positions on the LCD and two indicator lights in each upper corner. The lower left channel position can display both numbers and letters. The other five positions can only display numerical values.

### Display Modes

The behavior of each button press depends on the mode the dash is currently in. See the appropriate mode section below for a list of button behaviors in each mode.

There are 6 different modes.

- Setup Mode
- Real-time Mode
- Scroll Mode
- Min – Max Recall Mode
- Recording Mode
- Playback Mode

### Setup Mode

The dash setup parameters are divided in to six different categories. The setup parameters for each of the six categories are list in table 2 below.

Table 2

(shift light) SHFT	(system) SYST	(rpms) RPMS	(analogs) ANA	(warnings) WARN	(odometer) ODOM
Shift point 1	Back light intensity	Engine rpm odd fire setting	Water temp sensor type	High water temp warning level	Odometer enable
Shift point 2	Default display on power up	Engine rpm pulses per rev	Oil temp sensor type	High oil temp warning level	Drive shaft pulses per 1/8 mile/km
Shift point 3	Units of measure	Swept tach scale	Oil pressure sensor type	Low oil warning level	Drive shaft pulses per 1 mile/km
Shift point 4	Lap marker event enable	Rev limit warning level	Fuel pressure sensor type	Fuel pressure high and low warning level	Odometer start value
Shift point 5		Drive shaft rpm sensor type	Analog 5 custom channel sensor type	Analog 5 high and low warning level	
Shift point 6		Drive shaft rpm pulses per rev			

### Entering setup mode:

Turn on the dash. Enter a MED press on the **MODE** button by pressing and holding it for two warning light flashes. While in setup mode, a SHORT press on the **DISP** button will change the setup category you wish to program. A SHORT press on the **↓** button will enter in to the selected category and change to the next setup parameter within the currently selected category. A MED press on the **↑** button will step back to the previous setup parameter within the category. A SHORT press on the **←** and **→** buttons will increase or decrease the parameter value in small increments. A press and hold on the **←** and **→** buttons will increase or decrease the parameter value in large increments.

To exit setup mode enter a LONG press on the **MODE** button until the word WAIT is displayed in the lower left LCD position. Make sure you do not turn the dash off until the word WAIT has disappeared and the dash has reset.

Table 3 shows the behavior of each button while in Setup mode.

Button	SHORT Button Press (one light flash)	MED Button Press (two light flashes)	LONG Button Press (three light flashes)
<b>MODE</b>	Does nothing	Does nothing	Exit Setup mode
<b>DISP</b>	Change to next setup category	Change to previous setup category	Jump to SHFT category
<b>↓</b>	Change to next setup parameter	Change to previous setup parameter	Does nothing
<b>REC</b>	Does nothing	Does nothing	Does nothing
<b>→</b>	Increase parameter value in small step	Increase parameter value in large step (where appropriate)	Increase parameter quickly
<b>←</b>	Decrease parameter value in small step	Decrease parameter value in large step (where appropriate)	Decrease parameter quickly

Table 4 shows the available setup parameters and their programming category.

Category	Parameter Description	Lower Left LCD Code	Available Options (Lower Right LCD)	Factory Default
SHFT	Shift light programming	SLI T	0-20000 RPM for each of the six shift points	8000
SYST	Back light intensity level	bLI T	Level 0-9 9 = highest level	6
SYST	Default display on power up (see Real-time mode)	dI SP	1, 2	1
SYST	Units of measure	UNI T	Selects temperature units 0 = Deg F 1 = Deg C	0
SYST	Not Used at this time	MXON		
SYST	Lap time enable	LAPE	0 = Disable lap times 1 = Enable lap times	0

## Programming and Operation

RPMS	Engine RPM odd fire setting	OddF	0 – 8 Set to 0 if your engine is not an odd fire Set to 6 for odd fire V6	0
RPMS	Engine RPM pulses per revolution	R1 P	0 – 20 Typically, number of cylinders ÷2 Set to 0 for odd fire V6	4
RPMS	Swept tach engine rpm scale	SCAL	0 = 11,500 rpm max 1 = 13,500 rpm max	0
RPMS	Drive shaft sensor type	R2TY	0 = Hall effect 1 = Zero crossing	0
RPMS	Drive shaft pulses per revolution	R2 P	0 – 20	2
ANA	Water temperature sender type	WATT	0 – 13 4 = standard temperature sensor	4
ANA	Oil temperature sender type	OILT	0 – 13 4 = standard temperature sensor	4
ANA	Oil pressure sender type	OILP	0 – 13 see <a href="#">Pressure Sender Identification</a> section above	5
ANA	Fuel pressure sender type	FUEL	0 – 13 see <a href="#">Pressure Sender Identification</a> section above	12
ANA	User selectable custom analog sender type	CUST	0 – 13 see <a href="#">Pressure Sender Identification</a> section above	0
WARN	High water temperature alarm level	WWTH	0 – 400 Deg.	200
WARN	High oil temperature alarm level	WOTH	0 – 400 Deg.	300
WARN	Low oil pressure alarm level	WOPL	0 – 400 PSI	20
WARN	High oil pressure alarm level	WOPH	0 – 400 PSI	20
WARN	Low fuel pressure alarm level	WFPL	0 – 400 PSI	-100
WARN	High fuel pressure alarm level	WFPH	0 – 400 PSI	400



WARN	Low user custom alarm level	WCUL	0 – 400	-100
WARN	High user custom alarm level	WCUH	0 – 400	400
WARN	Engine RPM rev warning	REVL	0 – 20,000 RPM	8,500
ODOM	Odometer enable	OdEN	0 = Disabled 1 = Enabled	0
ODOM	Speedometer pulses per 1/8 mile/km	P8MI	0 – 20,000 Value entered should be divided by 10. If the real value is 2000 then enter 200	200
ODOM	Speedometer pulses per 1 mile/km	P1MI	0 – 20,000 Value entered should be divided by 10. If the real value is 2000 then enter 200	1600
ODOM	Odometer start value	OdOS	0 – 327,600 Value entered should be divided by 10. If the real value is 1000 then enter 100	0

Table 3

**Shift Light Programming:**

Enter a MED press on the **MODE** button by pressing and holding it for two warning light flashes. Since shift light is the first category the word SHFT should appear in the lower left display. Enter a SHORT press on the **↓** button to begin programming the shift light category. The word SLIT will now appear in the lower left display and the number 1 should appear in the lower center display to indicate you are programming the shift light for gear shift 1-2. The shift light RPM will appear in the lower right display. Use the **←** button to lower the shift light RPM and the **→** button to increase the shift light RPM. When you have finished programming the shift light RPM for the 1-2 gear shift press the **↓** button to program the RPM for the 2-3 shift point. The number 2 will appear in the lower center display. Continue programming each shift point by repeating the steps above until all the shift points have been set. We recommend programming any unused shift points to the last shift point RPM. For instance, if you are running a 3 speed automatic transmission you will only need the first two shift points. Program the remaining shift points 3, 4, 5 and 6 to the same RPM as shift point 2.

**Speedometer Calibration:**

The speedometer, odometer and trip odometer may not read correctly until you perform the following calibration procedure. In addition, the odometer must be enabled. See the Setup Mode section for more information.

- 1) Enter setup mode by entering a MED press on the **MODE** button.
- 2) Switch to the odometer program category by entering 5 SHORT presses on the **DISP** or until the word ODOM appears in the lower left display.
- 3) Step through the odometer parameters by entering a SHORT press on the **↓** button until you reach the **P1MI** parameter in the lower left LCD position.

## Programming and Operation

- 4) Drive exactly one mile and stop. If you are using metric units drive exactly one kilometer.
- 5) Enter a SHORT press on the **REC** button to set the calibration factor.
- 6) Exit setup mode by entering a LONG press on the **MODE** button until the word **WAIT** is displayed in the lower left LCD position.

### Real-time Mode

The dash will power up in Real-time mode each time it is turned on. While in Real-time mode you can scroll between two display pages by entering a SHORT key press on the **DISP** button.

If the odometer and/or lap marker is enabled, the **DISP** button will no longer control the lower right display.







When the odometer or lap marker is enabled a SHORT press on the **REC** button will change the lower right display between oil temp, odometer, trip odometer, lap time. A LONG press on the **REC** button will continue to start a new recording.

Table 5 shows the channel positions for the two display pages.

	LCD Section	Channel Displayed
DISPLAY #1	Swept Tach	Engine RPM
	Middle Center	Engine RPM or Speedometer if odometer is enabled
	Upper Left	Supply Voltage
	Lower Left	Water Temperature
	Lower Center	Oil Pressure
	Lower Right	Oil Temperature, Odometer(if enabled), Lap Time(if enabled)
DISPLAY #2	Swept Tach	Engine RPM
	Middle Center	Engine RPM or Speedometer if odometer is enabled
	Upper Left	Fuel Pressure
	Lower Left	Water Temperature
	Lower Center	Oil Pressure
	Lower Right	Oil Temperature, Odometer(if enabled), Lap Time(if enabled)

**Note:** The display sets listed in table 5 are the factory defaults. They can be customized using the optional DataLink PC software.

Table 6 shows the behavior of each button while in Real-time mode.

Button	SHORT Button Press (one light flash)	MED Button Press (two light flashes)	LONG Button Press (three light flashes)
	Switches between Real-time, min, max & playback modes	Enter setup mode	Reset minimum & maximum recall values
	Change display pages	Does nothing	Turn the back light on or off
	Enter scroll mode	Enter scroll mode	Does nothing
	Changes lower right display if odometer or lap marker is enabled	Does nothing	Begin recording data
	Does nothing	Does nothing	Does nothing
	Does nothing	Does nothing	Does nothing

**Scroll Mode**









Scroll mode allows you to scroll through all of the available channels. For instance, if you have added any channels on the V-Net port you can use scroll mode to view them. To enter scroll mode, enter a SHORT press on the  button while in Real-time mode. Entering scroll mode will cause the lower left channel position to display the abbreviated channel name or channel tag. The lower center position will display the channel value. To exit scroll mode, enter a LONG press on the  button.

Table 7 shows the behavior of each button while in scroll mode.

Button	SHORT Button Press (one light flash)	MED Button Press (two light flashes)	LONG Button Press (three light flashes)
	Switches between Real-time, min, max & playback modes	Enter setup mode	Reset minimum & maximum recall values
	Change display pages	Does nothing	Turn the back light on or off
	Scroll to next channel	Scroll to previous channel	Does nothing
	Begin recording data	Does nothing	Begin recording data
	Does nothing	Does nothing	Does nothing
	Does nothing	Does nothing	Does nothing

*Table 8 shows the channel tags appearing in the lower left position while in scroll mode.*

<b>Abbreviation</b>	<b>Description</b>
TI ME	Time since dash was turned on or recording was started. Time is reset to zero when recording starts.
RAT	Engine to drive shaft ratio. ENGINE RPM ÷ DRIVE SHAFT RPM
ERPM	Engine RPM
dRPM	Drive Shaft RPM (optional)
dMPH	Speed in MPH or KPH depending on calibration(optional)
LAPb	Lap marker switch state. 0 = open, 1 = closed
RECb	Record button switch state. 0 = open, 1 = closed
H2OT	Water Temperature
OI LT	Oil Temperature
OI LP	Oil Pressure
FUEL	Fuel Pressure
CUSTO	User Custom channel
bATV	Supply Voltage

In addition to the channels built in to the dash, which are listed above, you can use scroll mode to view channels that have been added using the V-Net port. Refer to the information provided with the V-Net module for the channel tag.

***Min – Max Recall Mode***

The min – max recall mode displays the minimum and maximum reading on all channels since the dash was turned on or the min – max values have been manually cleared. The dash does not need to be in Record mode for the min-max values to update. To display the minimum values enter a SHORT press on the **MODE** button. The word MIN will be displayed under the swept tach. To display the maximum values enter a SHORT press again on the **MODE** button. The word MAX will be displayed under the swept tach. While you are in min – max mode you may change displays or enter in to scroll mode to see additional channels if needed. To return to Real-time mode and exit min – max mode, again enter a SHORT press on the **MODE** button. The word PLAY will appear. This puts you in Playback mode which we will discuss in the next section. Again enter a SHORT press on the **MODE** button to return to Real-time mode. To clear the minimum and maximum values enter a LONG press on the **MODE** button in any mode except Setup mode.

***Record Mode***







The Ultra Dash has 1 megabyte of internal record memory. The default maximum recording length is 200 seconds. The recording length using the DataLink software. See the DataLink software section below for more information. While in record mode all channels except the warning indicators will be recorded. After a recording you may playback the data on the dash or download it to our optional DataLink PC software. Recorded data will remain in memory, even if the dash is turned off, for up to 2 days or until a new recording has been made. To start recording data enter a LONG press on the **REC** button or press and hold the remote record switch until the word **REC** is displayed below the swept tach position. To exit Record mode enter three consecutive SHORT button presses on the **MODE** button or turn off the dash. If the maximum record time is reached or the power is turned off, the recording will stop automatically. If you want to start a new recording you must enter and exit Playback mode or turn the dash off and back on. This prevents you from accidentally recording over your data by inadvertently pressing the record button. While in Record mode, all buttons behave the same as when in Real-time mode.

***Playback Mode***

Playback mode allows you to playback recorded data on the dash. To enter Playback mode, enter a SHORT press on the **MODE** button while in Real-time mode. This will put you in Min mode. Enter a second SHORT press on the **MODE** button to enter Max mode. Enter a third SHORT press on the **MODE** button to enter Playback mode. The word PLAY will display under the swept tach to indicate you are in Playback mode. Once in Playback mode use the **←** and **→** buttons to move forward and backward in time according to the table below. Enter a MED press on the **→** button to playback the recorded data at real-time speed.

## Programming and Operation

Table 9 shows the behavior of each button while in Playback mode.

Button	SHORT Button Press (one light flash)	MED Button Press (two light flashes)	LONG Button Press (three light flashes)
	Exit Playback mode	Enter Setup mode	Exit Playback mode and reset minimum & maximum recall values
	Change display pages	Does nothing	Turn the back light on or off
	Enter scroll mode	Does nothing	Does nothing
	Does nothing	Does nothing	Does nothing
	Step recorded data forward .02 seconds If playing real-time - Stop	Start playing recorded data at real-time speed.	Fast forward through recorded data (press and hold)
	Step recorded data backward .02 seconds If playing real-time - Stop	Rewind recorded data to beginning	Fast reverse through recorded data (press and hold)

### Warning Indicators

Your Ultra Dash has three types of warning indicators.

Internal warning light in the upper left and right hand corners.

Alpha display in the lower left position on the LCD.

External warning light output. (see **Wiring Port B**).

Table 10 lists the warning indicator behaviors and factory default levels

Warning Cause	Alpha Warning Tag	External Warning	Upper Left Internal Warning	Upper Right Internal Warning	Factory Default Level
High Water Temperature.	H2OT		X		200 Deg
High Oil Temperature	OILT		X		300 Deg
High Oil Pressure	OILP	X	X		400 PSI
Low Oil Pressure	OILP	X	X		20 PSI
High Fuel Pressure	FUEL			X	400 PSI
Low Fuel Pressure	FUEL			X	-100 PSI
High custom channel value	WCST			X	400 PSI
Low custom channel value	WCST			X	-100 PSI
Engine RPM Rev Limit	REVL			X	10,000 RPM

### IMPORTANT

Before using the dash, make sure to set the appropriate warning levels for each channel. Failure to do so may result in unwanted warning lights. See the Setup Mode section for information on programming the warnings.

## Programming Using the DataLink PC Software

The first step is to install the DataLink software in your PC computer. The DataLink software is used to program and configure your Ultra Dash. If you have purchased the PC download package you can also view real time data and upload recorded data from the dash for analysis.

### Installing the DataLink Software

The DataLink software manual will guide you through the installation of the software. Before you begin, please read the following notes.

#### *DataLink Software CD Installation*

Insert the disk in your CD drive and close the bay door. The installation program should run automatically. If it does not, follow the instructions printed on the CD label.

#### *Installing the License Disk*

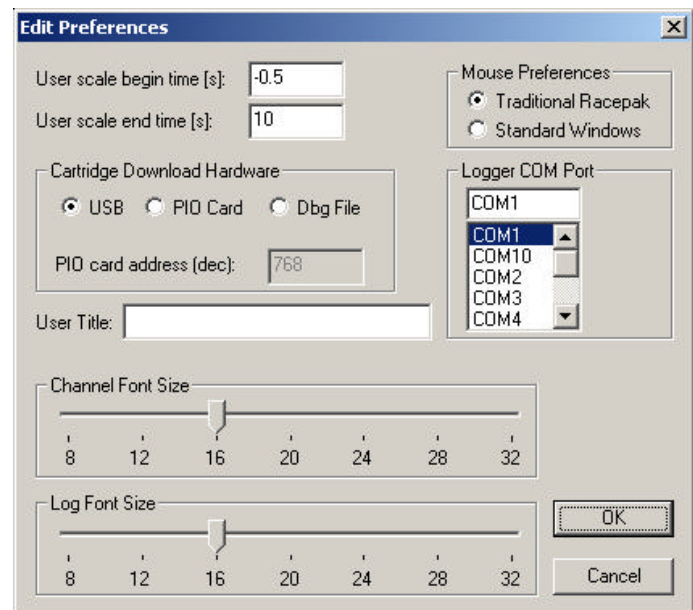
A software license disk (a 3.5-inch floppy) will have been supplied with the DataLink software. This disk contains a default configuration file for your new system and the security keys required to use the DataLink software with the Ultra Dash.

The DataLink software should ask you for a license disk the first time you start the program after a new installation. If it does not or you are adding a new dash to an existing DataLink installation you will need to select Read License Disk for the Security main menu item. When the **Select Items to Copy** dialog box appears make sure you check the **Copy Configuration Files** and **Copy License Keys** boxes before proceeding. This will add the new security keys, folder structure and configuration file to the existing DataLink installation.

### Connecting the Serial Communications Cable

The next step is to connect the serial communication cable (supplied with your LDX system) to the serial communications port on your PC. You will be connecting the DB9 female connector end of the logger serial communication cable to the mating connector on your PC. In most computer systems the mating connector will be labeled "Serial" or "COM". If your PC does not have a serial port you can use a USB to serial port adaptor. These adaptors are available at most computer stores for around \$50. Connect the other end of the cable to the dash using the pigtail adaptor. The pigtail adaptor allows you to permanently mount the stereo connector end of the cable in your dash panel for easy access.

The next step in the software installation is to tell the DataLink software which serial communications port on your PC you have connected to the serial communications cable. To do this, turn on your PC and start the DataLink program by clicking on the ICON on the Window's desktop. Next click on **Preferences** from the menu bar then select **Settings**. The dialog box on the right will be displayed.



Locate the **Logger Com Port** selection box and select the communications port to which the serial communications cable is connected. If the serial port you are using is built in to your PC the port should be marked near the connector. If you are using a USB to serial adaptor then you must follow the instructions provided with the adaptor to determine which port the adaptor software has installed itself on. Once you have selected the proper serial port select **OK** to accept your selection..

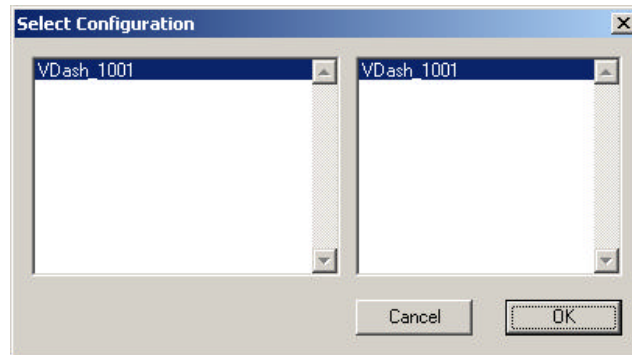
### Modifying the Dash Configuration

Each time you wish to modify the configuration of your dash you will need to perform the following steps;

1. Connect your PC to your data logger via the serial interface cable.
2. Start the DataLink program on your PC
3. Open the car configuration file by selecting **Open Car Configuration** under **File** from the menu bar.
4. Select the device/channel to be modified
5. Make the desired modifications to the device/channel
6. Apply power to your dash
7. Send the modified setup to the device
8. Save the modified car configuration file

The first step is to connect your PC to your dash using the serial interface cable supplied with the DataLink software.

The next step is to start the DataLink program by clicking on the DataLink icon located on the Windows desktop on your PC. If you selected your car configuration file as the default configuration file, the DataLink program will automatically open your car configuration file. If you did not select the car configuration file for your system as the default car configuration file you will need to open the car configuration file manually. To open your car configuration file select the **Open Car Configuration** menu item located in the **File** main menu selection. The following dialog box will appear.

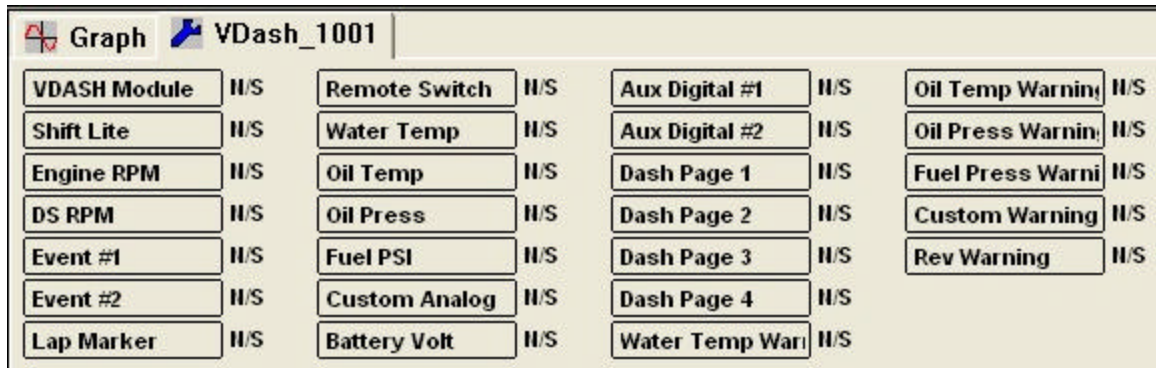


The list on the left-hand side of the **Select Configuration** box will display all of the file folders in your RacePakData subdirectory that contain valid configuration files. Select the folder on the left that is named VDash and the serial number of your dash. For instance, an Ultra Dash with the serial number 1001 would be named VDash\_1001. The list on the right will now contain the list of configuration files contained in this folder. Select **OK** to open the selected configuration file.

The next step is to read the current setting from the dash. To do this, connect the supplied serial cable between the dash and your PC and turn on the dash. Next, Start the DataLink software and click on **Edit** from the menu bar and select **Read VNET Config**. A status message box will appear, if everything is working correctly you see the message “Devices Read Successfully” when finished.

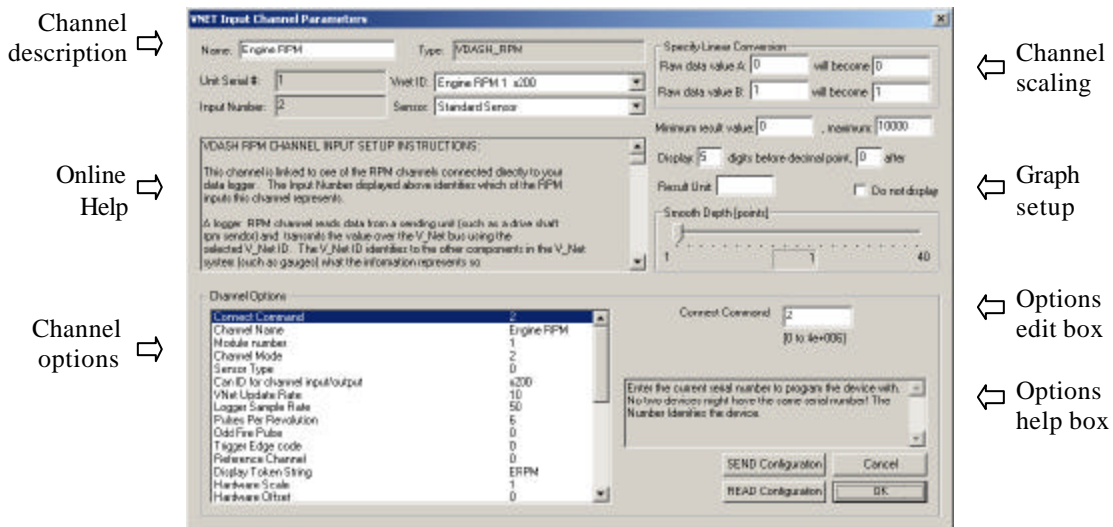
The wrench icon in the run file tab is used to indicate that this file is a car configuration file. Each of the buttons represents one of the devices/channels in your system. For instance the VDash Module button represents your Ultra Dash, the Engine Rpm button represents the engine rpm channel,





After you have opened the car configuration file the next step in modifying the setup of your system is to select the device/channel to be modified. To select a device/channel position the mouse cursor over the desired button, for instance VDash Module in our sample, and click the right mouse button. An edit dialog box, as shown below, will open to allow you to edit the parameters for that specific device/channel.

In addition to allowing you to edit the device/channels parameters the dialog box also contains online help to instruct you on the procedure for configuring the device and the options available for each of the parameters that can be modified. Although each of the dialog boxes for the different devices are slightly different, all of the dialog boxes have the same overall structure.



The first section to note is the **Channel Description** area. This area includes important information about the channel that you are editing. You should always check this area to be sure you are editing the correct channel. When you are sure you are editing the proper channel go to the **Online Help Scroll Box**. Read this section. It will give you step by step instructions on configuring the specific device/channel you are editing.

### Channel Description Area

The channel description area contains several fields that describe the channel that is represented by the button and the edit dialog box. The fields in order of importance are as follows:

**Name:** This is the user assigned name for the channel

**Type:** The type of device being edited

**Unit Serial #:** Displays the serial number of the device being edited.

**Input Number:** In devices with multiple input channels, this field displays the channel number in the device being edited.

**V\_Net ID:** Displays the channels V-Net ID.

**Sensor Type:** This field indicates the type of sensor connected to the channel.

The following describes the basic sections of the edit dialog box and their locations.

### Online Help Box

The online help box is a scrollable text area containing detailed instructions on how to configure this device. You should always read this section before editing any of the device parameters.

### Channel Scaling

This section is used to enter the calibration factors for the sensor connected to this channel. These factors are entered automatically by the system any time the Sensor type is selected. They must be entered manually only when a custom sensor calibration is required.

### Graph Setup

These fields are used to define how the DataLink program charts the data obtained by this channel. Please refer to the online help box for details.

### Options List Box

The options list box displays all of the user settable options for the device being programmed. To select an option to be edited, place the mouse cursor over the desired option and click the left mouse button. The options help box and the options edit box will be updated with appropriate information for the selected option.

### Options Help Box

The options help box displays detailed information on the option currently selected for editing.

### Options Edit Box

The option edit box will display an appropriate edit box for the option currently selected in the options list. The edit box will display the name of the option being edited, the current value of the option, and the range of values that can be entered for the option is appropriate. Enter the new value for the option here

After you have read the online help and have modified the setup parameters as desired, the next step is to send the new setup from the PC to the actual device being programmed. Be sure the dash is connected to your PC using the serial interface cable. Next apply power to your data logger system and wait for approximately 5 seconds for your system to enter normal operation. Next select the **SEND Configuration** button in the channel edit dialog box to send the information to the device being programmed. A progress box will be displayed to indicate whether the transfer is successful.

After you have successfully sent the new information to the device being programmed you should see the message Device Programmed Successfully at the bottom of the message log. Select the **OK** button to exit

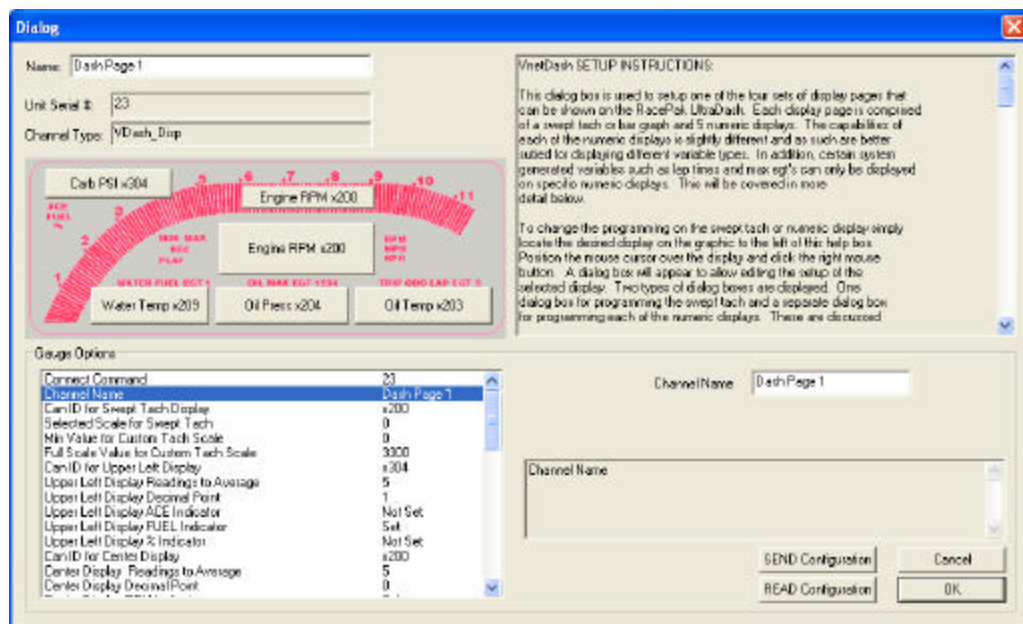
the dialog box. As a final step save the car configuration file to your disk by clicking on the save icon in the DataLink Toolbar or select the Save menu item located in the Files main menu selection.

You have completed the programming of the device/channel. Repeat the above process for each of the devices you wish to modify.

### Changing Dash Display Page Properties

The channel buttons labeled “Dash Page #1”, “Dash Page #2”, “Dash Page #3”, “Dash Page #4” represent the four LCD display pages that change when you press the **DISP** button on the dash. If you would like to change the variables displayed on a display page or change the characteristics of the displayed value perform the following.

- 1) Right click over the channel button of the display page you wish to change.
- 2) Review the instructions in the upper left dialog box.
- 3) Locate the graphic representation of the dash to the left of the help box and click on the button of the display to be modified.
- 4) Enter the desired parameters.
- 5) Click OK to accept the changes.
- 6) Repeat for all displays to be modified.
- 7) When you are finished editing each display page, click on the **SEND Configuration** button in the lower right corner.



### Adding or Removing V-Net Devices to your System

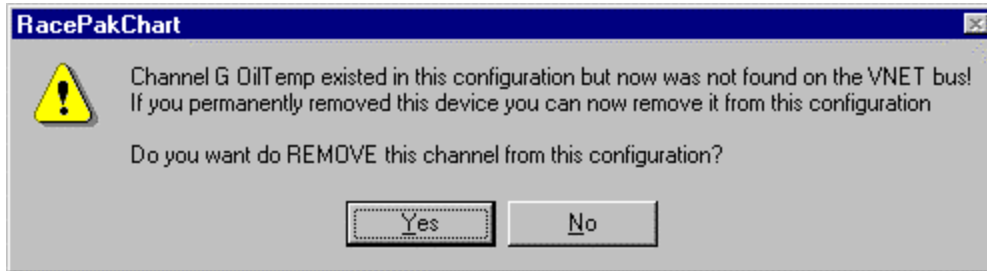
If you add or remove modules from your system, you will need to update your configuration file to match the configuration of your onboard system. If the changes are permanent you should edit your existing configuration file to match the new setup.

To update the configuration file load the appropriate configuration file by using the **Open Car Configuration File** menu selection located in the **File** main menu selection. Make sure the configuration file is the active file by positioning the mouse cursor over the file tab for the file and click the left mouse button.

Connect your PC to the dash using the serial communication cable and power up your system. Next select the **Read VNet Config** selection located in the **Edit** main menu selection. The DataLink software will now

query the V-Net modules in your system and will read in the current configuration of the system. During this process a message log dialog box will be displayed. The progress of the read will be displayed in the message log box.

If a V-Net module that is included in the current configuration file is not found in the System, the following message will be displayed.



If you have removed the module from the system you should select **Yes** to remove the module from the configuration file. If you have not removed the module from the system you should select **No** and then inspect your system to be sure the module is properly installed. When you have corrected the problem you should repeat the process above.

If you have added modules to the V-Net system the DataLink software will automatically insert new channel buttons for the new modules. You should review the programming of the new modules as detailed above and change the setup of the new modules as required.

## Recording Data

Anytime power is applied to your system the dash is ready to record data from the various sensors connected to the system. When the recording process actually begins and how much data is recorded is determined by how you program the setup features in your data logger. The factory default record length is 600 seconds or 10 minutes. The maximum record length will vary depending on the number of channels that are recorded and their sample rates. If you attempt to exceed the available memory by selecting high sample rates and long record times you will receive a warning message when attempting to send the configuration to the dash.

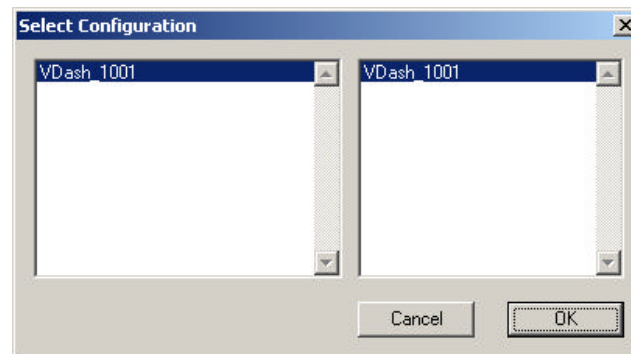
Anytime you press and hold the remote record button or press the **REC** button the dash will begin to record. In addition, you can select an alternate recording trigger such as engine rpm exceeding a certain threshold. In this mode the logger is programmed to begin recording only after one of the monitored data channels exceeds a preset threshold. For instance, the logger can be programmed to begin recording any time the Engine RPM exceeds 3000 rpm. Once the recording is started it will continue until the maximum record time is reached.

Once the recording is started all previously recorded run data is erased and the new recording is initialized. Please note approximately 5 seconds elapses from the time the recording is triggered and the time the first data point is recorded. This is the time required to initialize the recording. The following section will guide you through the setup of your data logger.

### Configuring Record Parameters

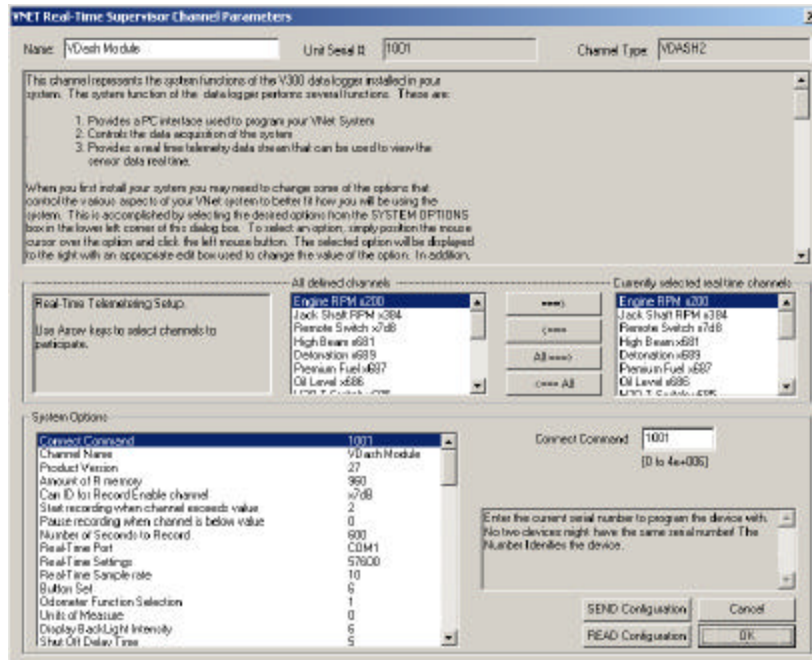
The first step in programming the record parameters in your dash is to connect your data logger to your PC using the serial communications cable. Once the logger is connected turn on power to the dash.

Next start the DataLink program and open the car configuration file for your system by selecting Open Car Configuration from the File menu bar. The Select Configuration dialog box will appear.



The list on the left-hand side of the **Select Configuration** box will display all of the file folders in your RacePakData subdirectory that contain valid configuration files. Select the folder on the left that is named VDash and the serial number of your dash. For instance, an Ultra Dash with the serial number 1001 would be named VDash\_1001. The list on the right will now contain the list of configuration files contained in this folder. Select **OK** to open the selected configuration file.

Next position the mouse cursor over the VDASH Module channel button and click the right mouse button. The logger edit dialog box will display on your screen.



Located in the lower left-hand corner of the dialog box is the Systems Options section. Several options and their present value will be listed on the left-hand side of the Systems Options section. To select an option for editing simply position the mouse cursor over the option and click the left mouse button. The option will become highlighted and the options edit box and option help box located to the right of the list will be updated with appropriate information for the selected option. Read the help information and enter the new value for the selected option. The options for setting the record parameters are discussed in detail below.

**Setting the Record Length**

Locate the **Number of Seconds to Record** option and select it as described above. The options edit box will now display the currently programmed number of seconds to record. Enter the new desired value in the edit box.

**Setting the Record Enable Channel**

The record enable channel and threshold are used as an alternate method to start recording data. Pressing and holding the remote record button or pressing the **REC** button on the dash will always begin a new recording. However, sometimes these buttons are inaccessible or can be easily forgotten. You can automate the start of a recording by programming the record enable channel and threshold parameters.

To program the record enable channel locate the **Can ID for Record Enable channel** option and select it as described above. The options edit box will be updated with the names and ID's of all of the currently parameters measured by your system. To enter a new value click on the down arrow located on the right end of the option edit box as shown below.



A list of the valid channel names and IDs will be displayed. Use the scroll buttons to display all of the values included in the list. When you have located the desired selection position the mouse cursor over the

selection and click the left mouse button to accept the selection. The top line of the edit box will be updated with the newly selected value.

### ***Setting the Record Start Threshold***

The record threshold option is used to determine when the recording is started. Recording will start any time the value of the selected record enable channel exceeds the value of the record threshold. If you have selected a channel such as Engine Rpm enter the desired rpm above which to start the recording. For instance 3000 rpm. The recording will begin any time the engine rpm exceeds 3000 rpm.

To program the record threshold select the **Start recording when channel exceeds value** option as described above and enter the desired value in the option edit box.

### ***Sending the Record Parameters to your LDX***

The final step in programming the record parameters on your dash is to send the configuration you just edited to from your PC to your dash over the serial communication cable. To send the information click on the **Send Configuration** button located in the lower left-hand section of the logger dialog box. A progress box will be displayed showing the information being transferred to your dash. When completed the last line in the progress box should read **Devices Programmed Successfully**.

After you have completed the programming of your dash the changes will become effective the next time you turn your data logger on.

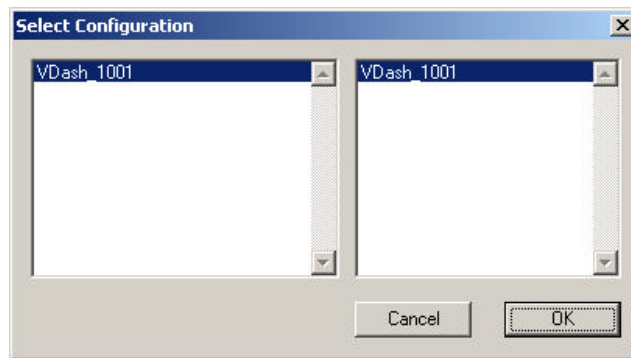


## Uploading Data

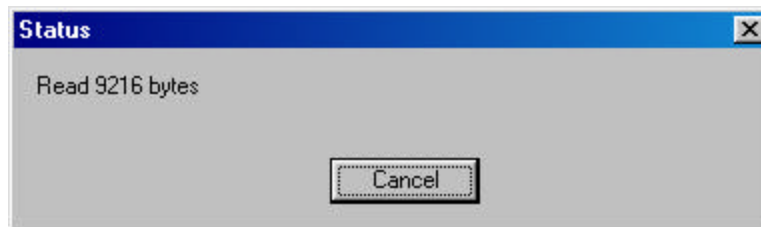
Data from the LDX data logger can be uploaded to your PC for data viewing and analysis using the RacePak DataLink program. To upload data, a serial communications cable must be connected directly between the LDX and an RS-232 serial port on your PC.

### *Using the Serial Communications Port to Upload Data to your PC*

To upload data from your data logger to your PC using the serial port, connect your PC to your data logger system using the serial communications cable provided with your system and turn on the power to your data logger. Next select the **New** file icon in the program taskbar or the **New** menu item selection located in the **File** main menu. The following dialog box will be displayed and you will be asked to select which configuration file to use. The list on the left-hand side of the **Select Configuration** box will display all of the file folders in your RacePakData subdirectory that contain valid configuration files. Select the folder on the left that is named VDash and the serial number of your dash. For instance, an Ultra Dash with the serial number 1001 would be named VDash\_1001. The list on the right will now contain the list of configuration files contained in this folder. Select **OK** to begin the data transfer.



The system will upload the data from your data logger. While the data is being uploaded the following progress box will be displayed to inform you of the systems progress.



When the download process is completed select the OK button to proceed. To finish the upload processes skip the following section and continue with the section on naming and storing your run data file.

### *Naming and Storing the Run Data File*

After the data has been uploaded a dialog box will be displayed to allow you to enter the session information. Enter the appropriate year and track by selecting the correct value from the selection lists. If the desired year and/or track is not on the corresponding selection list enter the new year or track by typing the name directly into the top selection box. The new year and/or track will be added to the selection list. Select the race type, and race sequence information by clicking on the desired radio button. The system will enter the date and time.



This information will be used to name the data file. The dialog box is shown below. If you need help on filling out the dialog box click on the help icon in the upper left hand corner of the dialog box.

The 'Session' dialog box is titled 'Session' and features a help icon in the top-left corner. It includes the following fields and options:

- Year:** A dropdown menu showing '2000'.
- Track:** A dropdown menu showing 'TestFiles'.
- Date:** A text field containing '09/14/2000'.
- Time:** A text field containing '09:18:48'.
- Race Type:** A group of radio buttons with options: Warmup, Test Session, Logger Test, **Qualifications** (selected), and Elimintions.
- Race Sequence:** A group of radio buttons numbered 1 through 9, with '1' selected.
- Next->** A button at the bottom left.

Select **Next**. Additional dialog boxes may be displayed. These are part of the Run Log sections that are user programmable to allow test information to be entered during the download process. Fill out the information as appropriate. The file save dialog box will then be displayed as shown below.

The 'Save As' dialog box is titled 'Save As' and shows the following details:

- Save in:** A folder icon followed by the text 'TestFiles'.
- File name:** A text field containing 'ATes070500L1.rpk'.
- Save as type:** A dropdown menu set to 'RacePak Files (\*.rpk)'.
- Buttons:** 'Save' and 'Cancel' buttons are located at the bottom right.

To save and view the file, select the **Save** button. To view the file only, select the **Cancel** button. If you select cancel you can save the file later if desired. A new file tab with the channel data will be opened. You are now ready to view the data.

Refer to the DataLink instruction manual for information on viewing the run data.

## Viewing Real Time Data on your PC

Data from the LDX data logger can be displayed and recorded real time on your PC computer using the DataLink program. Before you can view the data, however, you must first setup the real time parameters in your data logger. To setup your data logger's real time configuration, open your configuration file and right click on the VDash Module channel button. An edit dialog box will be displayed. In the center of the dialog box will be a Real – Time Telemetry Section.

### *Setting up the Logger Real Time Telemetry Parameters*

This section will contain two lists. The list on the left-hand side of the telemetry section will include all of the data channels currently being monitored by your data logger. The list on the right-hand side of the telemetry sections includes all those channels that will be displayed during a real time telemetry session.

To add a channel to the telemetry list highlight the name of the channel in the left-hand list and click on the right arrow → button to add the selected channel to the real-time channel list. To remove a channel from the real-time channel list highlight the name of the channel in the right hand list and click on the left arrow button ←. Remember that only channels in the right hand list will be displayed during a real time telemetry session.

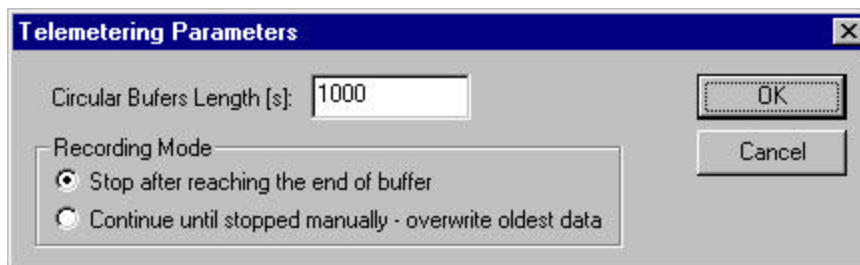
Next select the **Real Time Sample Rate** from the options list in the lower left-hand corner of the dialog box and select the desired real time sample rate. Note: the V\_Net Sample rate of each of the modules to be monitored should be equal to or greater than the real time sample rate. If they are not the last data points will be repeated during the sample process.

Next select the **Real Time Communications Port** option and type in the name of the serial communications port on your PC you will be using to receive the real time data from the V\_Net system. Normally this is the same as the default Logger Com Port set in the initial software installation. Normally this is COM1.

After you have edited the options use the **Send Configuration** button to transmit the setup data to your data logger. Next select **OK** to exit the edit box. You will need to turn the power to your data logger off and then back on to allow the changes to take effect. When you have completed the edit, save the configuration file.

### *Entering the DataLink Telemetry Parameters*

The final step in setting up the real time telemetry session is to set the DataLink real time recording parameters. These parameters are set by selecting the **Recording Parameter** menu item found in the **Telemetry** main menu selection. The following dialog box will be displayed.

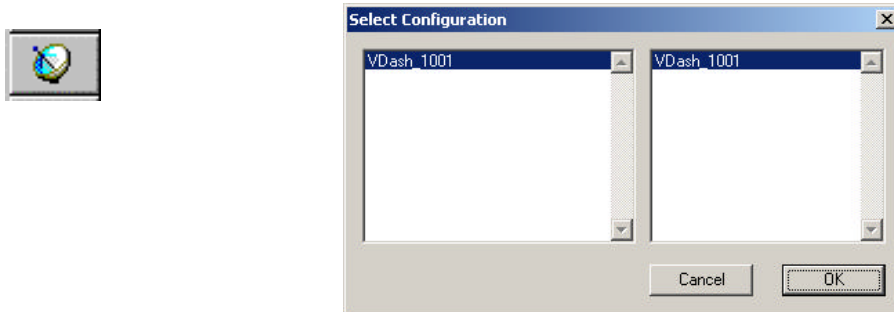


The first parameter **Circular Buffer Length** is used to set the amount of data to record in seconds. The **Recording Mode** is used to determine whether the recording will stop when the maximum record time is reached or whether the oldest data will be overwritten. For example if a Circular Buffer Length of 1000

seconds is entered and stop after reaching end of buffer is selected, the program will record data for 1000 seconds and stop. If continue until stopped manually-overwrite oldest data is selected the program will continuously record until stop by the operator. Only the last 1000 seconds of data will be stored.

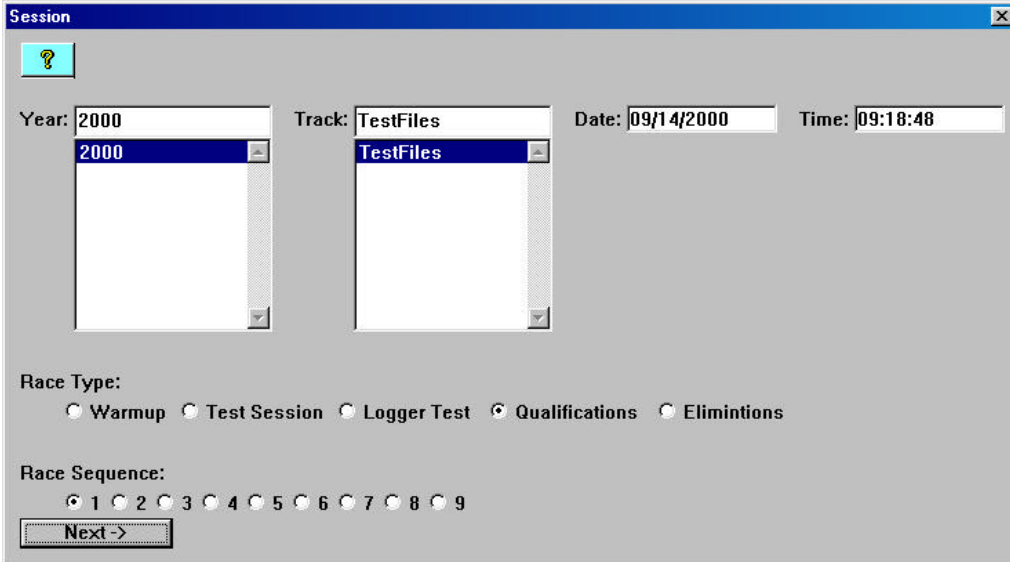
### *Starting a Telemetry Session*

The next step is to start a telemetry session. Select the **Telemetry** icon shown below or the **New Telem Session** menu item located in the File main menu selection. A dialog box, as shown below will be displayed and you will then be asked to select the configuration file to use for this session.



The list on the left-hand side of the **Select Configuration** box will display all of the file folders in your RacePakData subdirectory that contain valid configuration files. Select the folder on the left that is named VDash and the serial number of your dash. For instance, an Ultra Dash with the serial number 1001 would be named VDash\_1001. The list on the right will now contain the list of configuration files contained in this folder. Select **OK** to continue.

A dialog box will then be displayed to allow you to enter the session information (the same as when uploading run data). Enter the appropriate year, track, race type, and race sequence information as shown below. The system will enter the date and time.



**Session**

Year: 2000 Track: TestFiles Date: 09/14/2000 Time: 09:18:48

Race Type:

Warmup  Test Session  Logger Test  Qualifications  Eliminations

Race Sequence:

1  2  3  4  5  6  7  8  9

Next >

If you need help in filling out the dialog box click on the help icon located in the upper left-hand corner of the dialog box.

Select **OK** or **Next** depending on your configuration file. Additional dialog boxes may be displayed. These are part of the Run Log sections that are user programmable to allow test information to be entered during the download process. Fill out the information as appropriate.

The file save dialog box will then be displayed. Select the **Cancel** button. A new file tab with the channel data will be opened. You real time data session is now ready.

The real time session is controlled via two icons located below the context sensitive help icon in tool bar. Only one icon will be active at a time depending on the status of the telemetry session. The Start Data Acquisition icon is shown active on the left. The Stop Data Acquisition icon is shown active on the right.



To start the real time data acquisition left click on the **Start Data Acquisition** Icon at the bottom of the tool bar. The data acquisition will start at time 0. Once the real time data acquisition has been started the value of the data channels will be displayed next to the channel button in the top portion of the display area. To display the data from a channel on the graphics screen simply select the channel by left clicking on the channel button in the same manner you display data from a recorded file.

To stop the data acquisition left click on the **Stop Data Acquisition** icon located at the bottom of the tool bar. The real time data acquisition session will be suspended.

If you wish to continue the real time data acquisition simply click on the **Start Data Acquisition** icon. The telemetry session will restart at the same point it was suspended. If you wish to restart the session from the beginning select **Erase** from the **Telemetry** main menu. All previously recorded data will be erased from the file.

If you wish to save the data, stop the data acquisition and use click the **Save** icon located in the tool bar or select **Save** located in the **File** main menu.