



ST9918

LCD MOTORSPORT DISPLAY



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Introduction

Thank you for your purchase of the LCD Motorsport Display. This product features innovative full color LCD screen technology for unsurpassed visibility in all lighting conditions as a fully configurable, multi-parameter instrumentation and data logging solution with 4GB of memory standard suited for a variety of motorsports applications. Powerful DataPro Software provides intuitive configuration of supplied screen templates, inputs, and 16 individually configurable multi-color alarm status indicators and expert analysis of logged data. This display is capable of interpreting and displaying information from up to 12 discrete sensors, ECU CANbus, GPS, and additional sensor expansion modules and devices connected to the Auto Meter system network.

Features

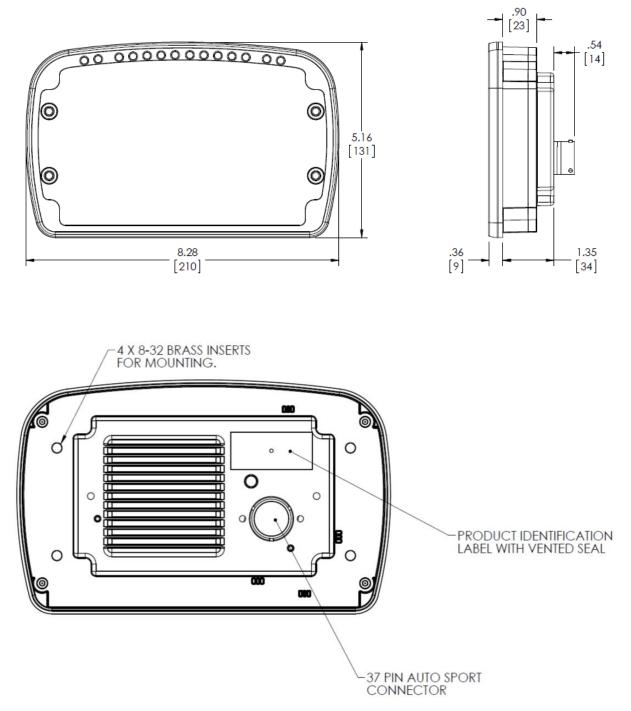
- General
 - o Dimensions 8.28" (211mm) Wide x 5.16" (132mm) High x 1.35" (35mm) Deep.
 - Carbon Composite Housing.
 - o Single 37 way autosport (AS) wiring loom connector for ease of installation and removal
 - 12 analog inputs for discrete sensors ideal for parameters not supported on the vehicle communication bus or ECU. Expansion modules available separately for additional inputs.
 - o DataPro Designer PC Setup utility
 - Fully user configurable from display via integrated 4 button interface for at track changes. Optional external switch set can be mounted within driver reach for easy access.
 - 16 configurable multi-color LED indicator lights can be programmed for a wide variety of alarm and shift / gear change indication functions
- Display
 - o 7.0" TFT LCD panel
 - o 1000 nit brightness for unmatched daytime and nighttime visibility
 - o 800 x 480 resolution
 - Onboard photo sensor for automatic brightness control.
 - Initial release supports multiple layers or screens selected from user- configurable templates (screens/instrument cluster designs/layouts), additional configurability supporting team selected graphics, parameter / instrument type and location, and size will be made available with future firmware and PC software releases.
 - Display features perfectly rendered virtual analog needles, value display bands, digital value indicators for vehicle parameters and configurable full color text warning message
 - o Patented Predictive Lap Timing Display for Driver and Vehicle Development
- Inputs:
 - 4 pulse/digital or analog inputs
 - o 8 analog inputs (0-5V or 0-12V)
 - 5 external switches / control outputs
 - Internal 3-axis accelerometer +/-6g
 - o Internal battery voltage
 - o GPS Mapping and Lap Timing

- Communications:
 - o 2 Configurable RS232 Connections (GPS Input, ECU Input, telemetry, etc.)
 - 2 Configurable CAN BUS Connections (CAN 2 dedicated to module network if other Stack modules are connected)
 - o 1 Ethernet port for PC comms: (config. & firmware upgrades)
 - 1 USB port: data exchange, config. copy/upload, & firmware updates.
- Data Recording:
 - o 4 GB Memory
 - Sample rates up to 1000 Hz (Total recording capacity 8000 samples per second)
 - Includes powerful DataPro Analysis Standard Software (optional Semi-Pro and Pro software updates available separately)
- Environmental:
 - o IP65 sealed
 - Operating temperature range: -7°C to +80°C
 - o Humidity: 0-100% RH
 - Continuous vibration up to 20g, Shock up to 50g
- Miscellaneous:
 - o Boot time / reset time to data screen: 2s
 - Boot time for full graphic application: 8s
 - o Weight: 700g
- Software
 - Compatible with Windows XP, Vista, 7, and 8 Operating Systems on 32 bit and 64 bit machines
 - Sensor Calibrations and Zeroing
 - Designer Full Configuration of Display offline including inputs, communications, alarms, screen layers, logging channels and rates and telemetry parameters
 - DataPro Logged Data Analysis, Data Download, manual start and stop logging commands (while connected), DataMonitor real time readings and diagnostics (while connected), Logbook, Math Channels
 - Run Manager Searchable management of system configuration files, datalogging session files, and vehicle profiles
 - ECU Gateway Template Editor Management, editing, and creation of CAN template files for use with ECUs and other CAN enabled devices
 - TeleMonitor Real time remote vehicle telemetry data analysis and logging (Enabled with Pro Analysis Upgrade

Getting Started

It is recommended that you unpack and connect the components in the system before you install it in your vehicle. This will enable you to familiarize yourself with operating the system and configuring it for the vehicle in which you intend to install it. This manual starts by taking you through the process of checking the system before installation, installing it in your vehicle, configuring the system and finally using it.

Display



Wiring

This product requires purchasing or building a custom wire harness.

Deutsch Autosport Connector. AS014-555N						
Pin Number	Function	Pin Number	Function			
1	B+ (8 to 18V)	20	Serial2 Tx			
2	Ethernet Tx+	21	Serial2 Rx			
3	Ethernet Tx-	22	USB V+			
4	Ethernet Rx+	23	USB GND			
5	Ethernet Rx-	24	Serial1 Tx			
6	USB D+	25	Serial1 Rx			
7	USB D-	26	Channel 1 input			
8	CAN1+	27	Channel 2 input			
9	CAN1-	28	Channel 3 input			
10	Sensor Ground	29	Channel 4 input			
11	Sensor +5V	30	Channel 5 input			
12	CAN2+	31	Channel 6 input			
13	CAN2-	32	Channel 7 input			
14	Switch 1	33	Channel 8 input			
15	Switch 2	34	Channel 9 input			
16	Switch 3	35	Channel 10 input			
17	Switch 4	36	Channel 11 input			
18	В-	37	Channel 12 input			
19	Switch 5					

Deutsch Autosport Connector: AS614-35SN

Recommendations and Requirements

Choose the appropriate multi-conductor jacket material for all connection based on estimated exposure temperature. Depending on wire routing some in cabin lines may not be subjected to high temperatures and standard PVC or comparable sheathing can be used. For sensor inputs that are connected on the engine side of the firewall, a higher temperature rated cable is required (Teflon insulation or comparable).

Power Requirements:

It is recommended to protect the +12V line (B+) with a 3 Amp fuse or circuit breaker.

Main system ground (B-) should NOT be used to provide a ground to any sensors. See connector pin #10 sensor ground.

Communication Inputs and Outputs:

CAN and Serial inputs require shielded, twisted pair wires with the shield connected to the system ground line.

Ethernet connection:

For direct connection to a laptop – standard cross-over Ethernet wiring is required (static IP).

For connection to a network – standard straight through Ethernet wiring is required (dynamic IP).

USB:

USB is used for transfer of data between the LCD dash and a standard USB-A jump drive (similar to jump drive supplied with each system). USB shield wire is required to be connected to system ground (B-) in order to maximize data transmission speed and accuracy.

Switches and Pro Control outputs:

The switches and Pro Control outputs share the same wire, but are configured in DataPro Designer as either a switch input or output.

For switch inputs, any normally open momentary switch can be used and needs to be switched to ground (B-). The LCD Motorsports Dash requires switch inputs to be switched to ground. This can be connected to the B- pin on the Autosport connector.

For Pro Control outputs, when the alarm is true, the line outputs 12V. There is a maximum of 200 mA current available for all configured outputs. If there is potential for connected devices to source more than this current, a relay is required.

Note: If a Pro Control output is configured and inadvertently switched to ground, it will not cause permanent damage to the unit, but the system will reset.

Sensor Inputs:

For sensors that require a 5V supply, the sensor must be powered by the LCD dash (sensor +5V) in order to condition the input signal accordingly.

For sensors that require a 12V supply, the sensor should be powered through the LCD dash harness (B+).

All sensor grounds must be connected to the Sensor Ground connection on the Autosport connector. Failure to do so will result in inaccurate sensor readings and potentially oscillating values.

Optional Components

Contact your dealer, a factory tech support rep, or visit our website for more information and assistance with purchasing these items.

Connectors – A variety of connectors are available for users wishing to create their own custom loom or incorporating custom sensors.

Warning Lights, Relays, and Switches – Additional external LED alarm lamps, relays, and switches are available for users wishing to make use of the switch input / control outputs on their display.

Expansion Modules – Connect these extra modules to your display via the system network connection to increase the number of available discrete sensor inputs available.

• ST269610 – 10 Channel Expansion Module

ST269611 – 20 Channel Expansion Module

GPS Receiver Module (ST269588) – Utilizes Global Positioning Data to provides vehicle position data for track mapping, vehicle speed, and lap times.

Lap Beacon and Receiver Assembly (ST546) - Triggers lap time information on the display and for logging analysis when the vehicle (equipped with the receiver) passes through an infrared beam broadcast across the track by the beacon assembly placed trackside.

Sensors and Signal Conditioning Accessories – A multitude of digital and analog options are available to monitor nearly every conceivable performance parameter required to extract the maximum performance potential of your vehicle.

Sensors for Data Logging Systems					
Item Number	Description				
Temperature S	ensors				
ST657	0C to +200C K-Type Thermocouple Interface with 0-5V output				
ST658	0C to +1100C K-Type Thermocouple Interface with 0-5V output				
ST659	4 Channel 0C to +1100C K-Type Thermocouple Interface with 0-5V output				
ST991	-20 to 150 deg C Fluid Temperature Sensor (M6x1)				
ST269547	Fluid Temperature Sensor, 150C / 300F (1/8 NPTF Male)				
ST269516	Exhaust Gas Temperature Two Sensor Kit, Exposed Tip Thermocouple				
ST269517	Exhaust Gas Temperature Eight Sensor Kit, Exposed Tip Thermocouple				
ST269518	Exhaust Gas Temperature Eight Sensor Kit, Armored Tip Thermocouple				
ST269519	Air Inlet Temperature Sensor, Thermocouple				
ST269520	Cylinder Head Temperature Sensor, Thermocouple				
Pressure Senso	rs				
ST269546	Vacuum Sensor, 30 inHg				
ST453	0-3.5 Bar Absolute Pressure Sensor with Low Freq DSP Interface				
ST740	0 to 3.5 bar/ 50 psi boost sensor (1/8 NPTF)				
ST269535	1 bar / 15 psi pressure sensor, solid state (1/8 NPTF)				
ST269567	2 bar / 30 psi pressure sensor, solid state (1/8 NPTF)				
ST269559	4 bar / 60 psi pressure sensor, solid state (1/8 NPTF)				
ST269536	6.9 bar / 100 psi pressure sensor, solid state (1/8 NPTF)				
ST747-					
1/8NPTF	10 bar / 150 psi pressure sensor, solid state (1/8 NPTF)				
ST269537	17 bar / 250 psi pressure sensor, solid state (1/8 NPTF)				
ST269538	34 bar / 500 psi pressure sensor, solid state (1/8 NPTF)				
ST749	100 bar / 1500 PSI pressure sensor, solid state (1/8 NPTF)				
ST269539	110 bar / 1600 psi pressure sensor, solid state (1/8 NPTF)				
ST269540	206 bar / 3000 psi pressure sensor, solid state (1/8 NPTF)				
Pulse Sensors					
ST492	Pulse Amplifier (e.g. Gearbox Sensor Amplifier)				
ST493	RPM Coil Connection Interface for MFD/MFR/MF				
ST670	Proximity Speed Sensor				
ST269510	Engine RPM Sensor				
ST269511	Driveshaft RPM Sensor Kit, 1.875" (47.6mm), Standard Ford 9"				
ST269512	Driveshaft RPM Sensor Kit, 2.187" (55.5mm), Large Ford 9"				

ST269513	Driveshaft RPM Sensor Kit, Universal
ST269514	Input Shaft RPM Sensor, Lenco Transmission
Pulse Sensor	'S
ST269515	Wheel Speed Sensor, Magnetic
ST269531	RPM Sensor, Magnetic, 5/16"-24 x 1.5
ST269532	RPM Sensor, Magnetic, 3/8"-24 x 1.5
ST269533	RPM Sensor, Magnetic, 3/8"-24 x 0.620
ST269589	GPS Ground Speed Module & Antenna, 10Hz, Pulse Output
Displacemen	it Sensors
ST972	Linear Potentiometer 50mm/2" (e.g. Suspension)
ST973	Linear Potentiometer 100mm/4" (e.g. Suspension)
ST977	Linear Potentiometer 150mm/6" (e.g. Suspension)
ST974	Linear Potentiometer 200mm/8" (e.g. Suspension)
ST976	300mm/12" String Potentiometer (0-5V output)
ST978	Rotary Potentiometer 360Deg (e.g.Steering)
ST979	Rotary Potentiometer Sensor 120Deg (e.g. pedal angle)
Force/Accele	eration Sensors
ST791	+/- 5g Accelerometer with 5Hz 5-pole Butterworth Low-pass Filter
Miscellaneou	is Sensors
ST994	Wideband Lambda Sensor & Interface 0-5V, 1 Channel
ST996	Wideband Lambda Sensor & Interface 0-5V, 2 Channel
ST269523	Wideband Lamda Sensor & 0-5v Interface, 8 Channel
ST269552	Replacement Wide Band Lambda Sensor for ST994/ST996
ST995	5Hz GPS Receiver with NMEA Interface
Adapters for	Standard Sensors
ST154003	1/8NPTF to M10 adapter
ST154006	1/8NPTF to 1/8BSPT adapter
ST154012	M6x1 to M10x1 adapter
ST154013	M6x1 to 1/8NPTF adapter
ST154015	1/8BSP to M10x1 adapter
ST154016	1/8BSP to 1/8NPTF adapter
Accessories	-
ST510	2 Switch kit
ST511	3 Switch kit
ST514	4 Switch kit
ST581	5 off SureSeal Plug (Male) Kit
ST582	5 off SureSeal Receptical (Female) Kit
Lap Timing S	System
ST543	Infrared Lap Timing System receiver only
ST544	Infrared Lap Timing System trackside beacon only
ST546	Infrared Lap Timing System receiver & beacon

Tire Pressure and Temperature Monitoring Systems – Stack offers precision lightweight, durable and batteryless pressure and temperature monitoring systems for comprehensive tire analysis in club and professional racing applications.

Video – Stack offers multi-camera video modules for club and professional racing applications which may be connected to your display to expand your logged data analysis with precisely coordinated, constantly synchronized video frame to recorded sample data allowing you to really see what is happening on track.

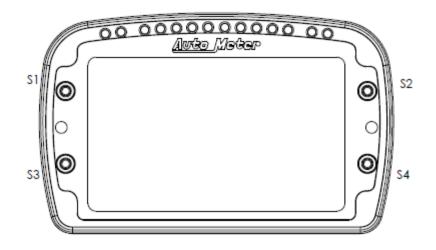
Other Devices – Other devices such as ECUs (Engine Control Unit) and PDMs (Power Distribution Module) may be connected to your display. Contact your dealer or factory support rep for details.

Switches

There are four switches used to control the functions of the LCD Motorsport Display These are on the Keypad on the display face and can be mirrored externally by connecting switches to S1-S4 pins on the display wire harness in applications where the driver cannot reach the display when belted into the vehicle. Note: Employing external switches limits or removes the ability to utilize Pro Control outputs from these leads.

A fifth switch may optionally be connected to S5 (in the event that an infrared lap receiver is not fitted) to allow a manual driver lap trigger or set a GPS lap trigger point (if the optional GPS receiver is utilized).

The normal functions of the switches are:



Normal Operation:

- S1 Clear Warning will clear LED and text warning, not bubble.
- S2 Peak Recall (single button toggle/clear)
- S3 Next graphic layer
- S4 Toggle day and night brightness settings
- S5 Lap switch beacon input, manual input, or capture start line for GPS lap timing

S1 (Long press) – Software Banner – display firmware versions, IP address and functions. Press S3 and Press S4 within 1 second – enter sensor calibration mode.

Factory Reset:

To perform a factory reset, press and hold S1 & S2 for several seconds while power is applied to the unit.

You can install the switches in any convenient location.

When installing the switches, it is important that the driver can reach the Peak and Layer Switches easily in order to show peak values and

Sensors

Auto Meter sensors include specific installation instructions that should be utilized in addition to the information presented below to ensure optimum performance.

Wheel Speed and RPM Sensors:

The LCD Motorsport Display may be connected to a range of proximity and magnetic sensors to measure, for instance, wheel or transmission speeds. These sensors are used to measure wheel or shaft rotation in order to display the speed in MPH or RPM. The sensor provides an electrical pulse to the system each time a target object, such as a CV joint bolt or a rare earth magnet, passes near to the end of the sensor. When configuring the system you need to supply the number of ferrous objects that will be counted for each revolution. In addition for speed you must supply the roll out / circumference of the tire. Take note of these details so that you may enter them into the display configuration via PC detailed later in the manual.

Fitting proximity sensors:

These sensors are triggered by a number of 'Targets' (see Sensor Targets). It is essential that these devices and their cables are positioned as far as possible from all sources of intense heat and from the ignition HT leads to avoid interference.

Sensor targets:

Proximity sensor targets can be any suitable metallic object which passes within range of the sensor tip. Iron and mild steel targets are preferred as they give the strongest signal to the sensor. Aluminum, brass and copper targets give approximately one third of the sensing range which makes setting up the sensor difficult and may cause the speed signal to be unreliable. Magnetic sensors are supplied with rare earth magnet targets which may be bonded to the vehicle component in question. Aluminum mounting collars fitted with magnets are also available for purchase from Auto Meter separately.

It is important that the sensor and targets are rigidly mounted so they do not move with vibration. The sensor bracket should have a suitable hole for the threaded portion of the sensor to pass through. Targets should be at least 10 mm (5/8'') across and stand 4 mm (5/32'') proud (Fig.1). Smaller targets can be used but these will reduce the range. Small aluminum, brass or copper targets will generally not work. Nothing except the targets should come within 6 mm (1/4'') of the end of the sensor. If the sensor mounting position is to be recessed, a hollow of 24 mm (15/16'') diameter and at least 4 mm (5/32'') deep should be allowed around the sensor.

Sensor fitting and adjustment:

- 1. Connect the Mini Sure-Seal connector of the proximity sensor to the system via PA1 to PA4 of the Sensor Harness. Turn on the power.
- 2. Assemble the first (rear) nut onto the sensor.
- 3. Insert the sensor into the mounting bracket hole and fit the front nut.
- 4. Rotate the wheel or shaft and move the sensor slowly forward by undoing the rear nut counterclockwise until the built-in light (LED) comes on for every target.

That light is used to check that both the mechanical and electrical installations have been performed correctly. This light should be ON when a target is in front of the sensor.

- 5. Undo the rear nut half a turn more.
- 6. Without rotating the sensor or rear nut, finger-tighten the front nut.
- 7. Tighten the rear nut with a 13 mm AF spanner. Do NOT let the sensor rotate. Do not over-tighten; one flat of the nut should be sufficient. A small amount of silicone sealer will prevent it vibrating loose.

Checks for correct installation and adjustment:

- Rotate the wheel or shaft and check that the built-in sensor light comes on for each target and goes
 off between each target.
- Check that both the sensor and targets are rigidly mounted.
- Check that the front nut or any fixings do not cover any part of the sensing end.
- Check the gap between sensor and any of the targets is NOT less than 0.5 mm (3/16") so there is no risk of the sensor hitting the targets.

Fluid Pressure Sensors:

The LCD Motorsport Display can be connected to a range of fluid pressure sensors to measure, for instance, Oil Pressure and Fuel Pressure.

Fitting the pressure sensors:

- Position the sensors and their cables as far as possible from all sources of intense heat and from the ignition HT leads.
- Each sensor can either be screwed in directly to the monitoring point or fitted separately by using a suitable pressure hose to connect it to the monitoring point.
- Note: Direct mountings on some racing engines and related mounting points should be avoided because excessive vibration can affect the long-term life of the sensor or engine components to which they are connected (i.e. fuel rails and fitting extensions)
- Do not over-tighten the sensor.

Fluid Temperature Sensors:

The LCD Motorsport Display can be connected to a range of temperature sensors to measure, for instance, Water Temperature and Oil Temperature.

Fitting the temperature sensors:

- Position the sensors and their cables as far as possible from sources of intense heat and from the ignition HT leads.
- Mount each temperature sensor directly in the appropriate fluid line. Screw the sensor into a suitable mounting boss so that its tip lies near the middle of the flow of fluid.

Exhaust Gas Temperature Sensors (EGT):

The LCD Motorsport Display can be connected to 4 channel K-Type thermocouple sensor modules to measure, for instance, Exhaust Gas Temperature. These typically measure temperatures from zero up to 200°C (400°F) or 1100°C (2000°F).

Fitting the thermocouple sensors:

 Mount each temperature sensor directly in the appropriate exhaust header primary tube. Screw the sensor compression fitting into a suitable mounting boss so that its tip lies near the middle of the flow of exhaust gasses.

Position Sensors:

The LCD Motorsport Display can be connected to a range of position sensors for measuring vehicle component position movements, such as, for example throttle, steering or damper movements. Position sensors must be calibrated to installation orientation.

Fitting Position sensors:

ST979 Rotary position sensor with arm:

This sensor has a spring loaded lever which should be attached using a length of stranded wire to, for instance, a throttle pedal.

- Find a mounting position which does not interfere with the drivers feet or operation of the controls.
- Once the intended location for fixing is determined, drill 4.5 mm (3/16") holes to provide clearance for the supplied bolts
- Bolt the sensor in place and connect it to the wiring harness
- Using the length of cable supplied, pass the end of the cable through the hole in the lever arm and attach the other end to the side of the pedal lever.
- Adjust the cable tension until the lever arm is just pulled away from its resting position. This
 adjustment should be checked regularly to remove any slack in the cable which may give rise to
 errors in throttle position.

ST973/9 Linear Displacement / Travel Sensors:

The linear displacement sensor should be mounted between the vehicle's chassis and a suspension member. These sensors are available with various maximum displacements to suit different suspension systems.

- Find mounting positions on the suspension members and the adjacent chassis.
- Once the intended location for fixing is determined, drill 5 mm (3/16") holes and fit suitable bolts.
- Attach the sensor body to the chassis and the extending arm to the suspension.
- Connect the sensor cable to the wiring harness.

The spherical bearings at each end of the sensor are designed to absorb any bending forces on the sensor rod and should not be restricted in any way. Failure to do this will result in bending forces being applied which will cause the sensor to fail!

The sensor will be damaged if it is allowed to extend or compress beyond its normal range of movements.

Hydraulic Pressure Sensors:

The LCD Motorsport Display can be connected to a range of hydraulic pressure sensors to measure, for instance, Brake Pressure.

Fitting the pressure sensor:

Reliable braking performance is vital to the safe operation of your vehicle and only a competent mechanic should attempt to fit this sensor. Only high pressure brake line quality fittings should be used!

- Position the sensor and its cable as far as possible from all sources of intense heat and from the ignition HT leads.
- The sensor has a Dash 3 female thread. Use a suitable adaptor to join it to a three-way connector block inserted into the brake line.
- Ensure the sensor is mounted at a low point with its opening upwards to allow trapped air to be removed during the brake bleeding process.

CAN ECU Interface:

The LCD Motorsport Display can be connected to an Engine Control Unit equipped with CAN data output to enable the display to share engine performance parameters, reducing the requirements for additional wiring and sensor installation.

• The CAN Lo and Can Hi from the LCD Motorsport Display will be connected to CAN Lo and CAN Hi respectively on the CAN output of the ECU.

It is common for the CAN Hi and CAN Lo connections to be identified incorrectly. If no signal can be seen, wires may need to be swapped!

• A configurable CAN terminator is installed on each CAN line in the LCD Motorsport Display and should be switched on in the configuration procedure detailed later in this manual if required.

To determine if the terminator is required, consult the technical sheet / manual for your ECU or contact your ECU manufacturer for confirmation. In the event that this information is not available, you may measure the resistance between CAN Hi and CAN Lo on your device with a digital multimeter. No resistance needs the terminator enabled and a resistance of 120 Ohms requires no terminator!

• Finally configure the LCD Motorsport Display for the CAN ECU interface using DataPro Designer.

Infra-red Lap Timing System:

The Lap Timing system consists of two parts:

- A Lap Timing Receiver (ST543) which is fitted to your vehicle and responds to a coded infra-red signal.
- A Trackside Beacon (ST544) which transmits an infra-red beam to activate the lap timing sensor.

ST543 Lap Timing Receiver:

The lap timing receiver is actuated by an infra-red beacon positioned at the side of the track. The receiver is fixed to a rigid bracket mounted at a convenient position on the outside of the vehicle where it is able to detect the signals from the beacon.

- It is secured through a 18mm (0.7") diameter hole by two nuts with M18 x 1mm threads.
- This sensor must be positioned horizontally and square to the axis of the vehicle.
- In order to detect the signals from the beacon it must be situated outside the vehicle.
- It should, if possible, be positioned so that other vehicles that are being overtaken (or are overtaking) at the moment your vehicle passes the beacon do not block the signal.

After detecting a signal from a beacon, the system does not recognize any further signals for a period of ten seconds. This is to prevent multiple lap times being recorded if there is more than one Auto Meter beacon positioned along the pit wall!

ST544 Trackside Infra-Red Lap Beacon:

The trackside infra-red lap beacon works with the ST543 lap timing receiver to trigger the LCD Motorsport Display to record a lap time. The housing has a threaded socket on its base for mounting to a standard photographic tripod (not included). It should be located as follows:

- As near to the start-finish line as possible. A feature of DataPro allows the offset between the beacon and the start line to be adjusted.
- At the same height as the on-vehicle infra-red receiver.
- Level so that it emits a horizontal beam.
- It must be between 2 and 30 meters (6 to 100 feet) from the vehicle when the vehicle passes it.
- Avoid positioning the beacon so that the sun is directly behind it when it is being used.
- Where the unit is to be used for lengthy periods in very hot or sunny conditions, it should be protected by shading it from direct sunlight.
- Do not allow water to be sprayed onto the transmitter lenses. During wet conditions fit a protective peak over the beacon.

To prevent distortion of the coded infra-red signal, do not cover the beacon with a plastic bag!

Power supply to trackside beacon:

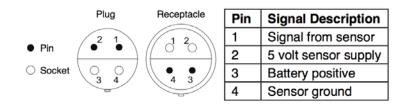
The trackside beacon operates from a 12 volt DC supply. A battery with a minimum rating of 2.5 Amp/hour is recommended. This will provide approximately 15 hours of continuous operation. The condition of the battery is indicated by the color of the LED indicator on the front panel of the unit:

- Green The voltage is, at present, adequate for use
- Red The voltage is too low (replace or charge the battery).
- No color The battery is exhausted or disconnected.

Mini Sure-Seal Connectors:

Stack data logging sensors are fitted with a four way ITT Cannon Mini Sure-Seal (MSS) connector.

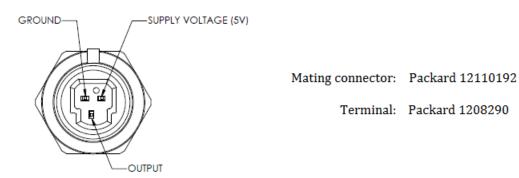
A plug (also known as the male end and smaller of the two connectors) must be connected on the ends of the Sensor Harness. The following polarity is observed in all cases:



Mini Sure-Seal connectors offer excellent vibration and waterproof performance. However, they do not have a positive locking mechanism, and thus caution must be observed during installation to prevent strain such as bending or pulling load from being placed upon them which can cause the connector to fail!

Packard Connectors:

Some pressure sensors are supplied with an integrated Packard connector.



Software Installation

Once this process is completed, open the DataPro folder and double click the Setup.exe icon to launch the InstallShield Wizard and follow the on screen instructions to complete your installation.

DataPro will install the following icons on your Desktop as part of this installation process:

- Designer Full Configuration of Display offline including inputs, communications, alarms, screen layers, logging channels and rates and telemetry parameters
- DataPro Logged Data Analysis, Data Download, manual start and stop logging commands (while connected), DataMonitor real time readings and diagnostics (while connected), Logbook, Math Channels
- Run Manager Searchable management of system configuration files, datalogging session files, and vehicle profiles
- ECU Gateway Template Editor Management, editing, and creation of CAN template files for use with ECUs and other CAN enabled devices
- TeleMonitor Real time remote vehicle telemetry data analysis and logging (Enabled with Pro Analysis Upgrade)

Configuration

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Telemetry		-			-
Display	Logger with Displa	ay (12i/p VSR, 50Hz 20ch 512Kb Rec)	 Show Legacy S 	systems and Displays	
Video	Configurable Dasl				
. S Aldeo	LCD Race Dash	(16 i/p, 1000Hz Rec)			
Gateway	Fixed				
	ST901273	Display System			
GPS	Video Data Overla	(12i/p Config Video Data Overlay Only)			
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Steering Wheel		User-Defined System	=		~
	Multi-Function Dis	,			
Math Channels	ST8916	(13i/p MFD, 200Hz 45ch 32Mb Rec)			
Miscellaneous	ST8916 (2011)	(13i/p MFD, 200Hz 45ch 32Mb Rec)			
in wiscellaneous	ST9916 (2011)	(13i/p MFD, 200Hz 45ch 32Mb Ev Rec)			
	Multi-Function Reg	corder			
	ST8956	(14i/p MFR, 200Hz 45ch 32Mb Rec)			*
	ST8956 (2011)	(14i/p MFR, 200Hz 45ch 32Mb Rec)			Continue
	ST8957 (2011)	(24 i/p, 200Hz 45ch 32Mb Rec)			
Ready	ST89575	(24 i/p, 200Hz 45ch 32Mb Rec)		System	
neauy	Multi-Function Eve	ent Recorder		system	

On the left hand of the screen various icons can be seen that allow navigation to menus used to configure different elements of the LCD Motorsport Display. The following is a list of the menus and their functions.

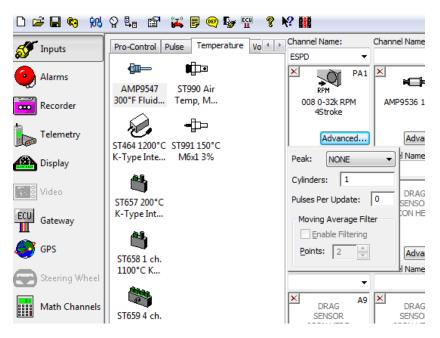
Menu	Function
Inputs	Configure pulse (digital), analog, and resistive inputs for sensor channels 1-12.
Alarms	Configure alarms - LED warning, on screen text warning, Pro Control outputs, & shift lights.
Recorder	Set channels to be recorded on the internal memory including sample rates for each channel.
Telemetry	Set channels that can be output to a telemetry module.
Display	Design screen layouts and set day and night brightness levels.
Video	Used for connecting a VS module to the system. For DVL configuration, reference DVL software.
Gateway	Configure CAN inputs (select from various protocols or create custom CAN inputs).
GPS	Enable and configure GPS inputs and GPS lap timing.
Steering Wheel	This feature does not apply to configuring the LCD Motorsport Display.
Math Channels	Configure calculated gear position and enable other math calculations.
Miscellaneous	Other settings - enable internal CAN terminating resistor.

Connections

Inputs

Select sensor from sensor category tabs on the left, and drag and drop to the desired channel box matching the harness sensor loom label where the sensor has been connected. Select the appropriate channel name from the drop down menu or enter a custom channel name. Designer will not allow you to place sensors on channels where they cannot function.

Please note: Sensors that require calibration (linear travels, throttle position, pedal sensors, etc.) must use the default name from the drop down menu so that the zero position can be configured.



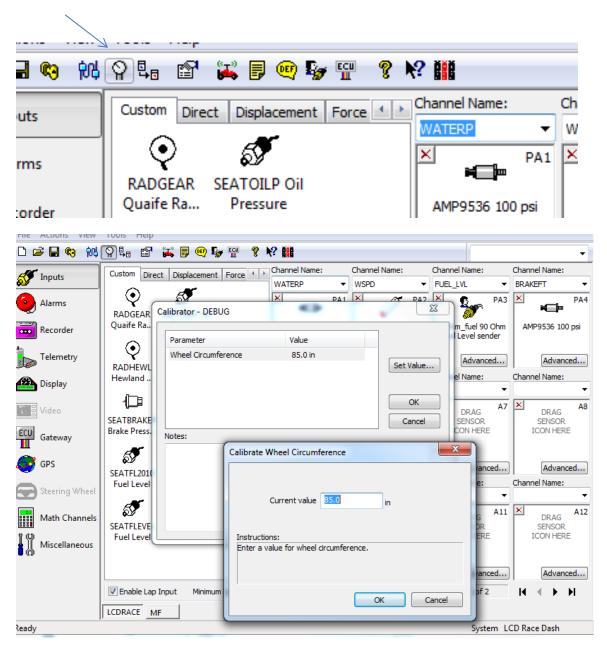
Configuring the Engine RPM Input

For ESPD RPM inputs, click on the Advanced button after placing the sensor input type in order to and select the number of cylinders. Adjusting Pulses Per Update upwards from zero will delay the response time of the input but will allow for filtering of undesirable spikes. It is recommended to leave this setting at 0 for now.

Configuring Wheel Speed Inputs

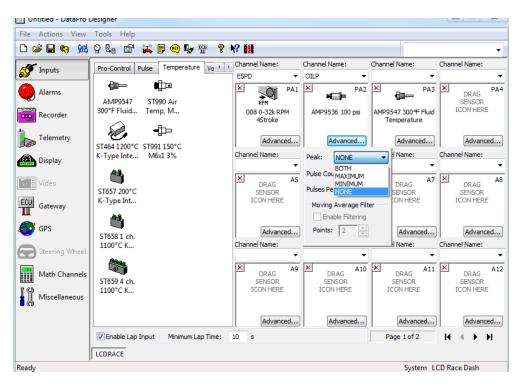
When setting up wheel speed inputs (WSPD) – Select the sensor and the number of pulses per wheel revolution for the vehicle application adjusted under the Advanced button for the channel. The wheel (tire rollout) circumference must be entered in the vehicle calibration window.

Calibration Icon



Click the Set Value tab and enter the wheel circumference.

Other non-zero sensors will be calibrated after the initial configuration is uploaded.



In the advanced tab for other sensors, Peak options can be selected for none, minimum, maximum, or both. These values will show up on the screen when the peak recall switch is pressed.

Advanced users may also choose to enable Moving Average Filters for any particular sensor channel to eliminate noise and smooth monitored and recorded data. Once enabled you will be able to select the number of data points over which the Moving Average applies. Increasing this number will progressively smooth the data trace, increasingly at the expense of missing critical data points outside of the normal trend. It is recommended that you leave Moving Average Filters disabled for all channels at this time.

Several internal sensors can be enabled and disabled (g meter and battery) from page two of the inputs section. Utilize the arrows in the bottom right hand of the window to navigate back and forth between input pages.

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Recorder	300°F Fluid Temp, M	DP8_VERT_G ±8G Vertical	RP8_LAT_G ±8G Lateral	FP8_LONG_G ±8G Longitudinal	DXBATT Battery Voltage
Telemetry	- De	Advanced	Advanced	Advanced	Advanced
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Display Display					
Video	ST657 200°C				
ECU Gateway	K-Type Int				
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ers 😽	ST658 1 ch. 1100°C K				
Steering Wheel	1100 C K				
Math Channels					
10	ST659 4 ch. 1100°C K				
Miscellaneous					
	Enable Lap Input Minimum Lap Time:	10 s		Page 2 of 2	I I I I I
	LCDRACE				
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Internal Channels (G Meters & Internal Battery)

The Motorsport LCD Dash has an internal 3-axis accelerometer and internal battery voltage monitor. In order to access these channels for display and logging, simply check the pre-defined channel to enable.

Moving Input Channel Locations

To quickly swap or move sensor input locations in your configuration once you have begun the configuration process or at a later time when editing an existing configuration file, utilize the Move Input feature.

Creating a Custom Sensor Scaling

Custom Sensor is a feature upgrade for your LCD display available via the Semi-Pro software pack. If you have purchased this option, you may utilize the Custom Sensor Manager to Create, Edit, Import and Export custom / 3rd party sensors for your display.

Alarms

Alarms communicate critical condition on the vehicle to the driver and may encompass any combination of Illuminated LEDs, Colored Channel Value Bubbles, Channel Markers, Screen Layer Change, Pro Control Output Activation and Text Display Messages. These may be set for all channel parameters monitored by the display.

Creating an Alarm

To set an alarm, click the Add tab and select the channel, the state (above or below), the alarm value, and any delay (the amount of time that the condition must occur before the alarm is activated.

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🧶 GPS		
Steering Wheel	Gates Name Channel Condition Value Delay (ms)	
Math Channels	Edt	
Miscellaneous	Add Remove	Shift Lights
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Ready		System LCD Race Dash

Gates

Gates provide the ability to assign multiple conditions that must occur for an alarm to activate. For example, setting a gate for ESPD above 750 RPM and using it for all LED warning conditions will allow alarms to be disabled when the engine is not running – negating a low oil pressure warning when the car is switched on in the paddock but the engine is off.

For each gate that you create, choose a channel, condition, value, and action delay.

For each warning condition, the following options are available:

- **Enable Gate** Utilize a gate created using the technique above a combination of event triggers to activate an alarm.
- Enable Action Automatically change to a specific screen layout, set Pro Control output.
- **Illuminate LEDs** set warning LEDs to turn on under specific conditions.
 - **Modes**: Solid, flashing, alternating (two or more LEDs alternating on and off).
 - **Colors**: red, yellow, blue, green, amber, magenta, or cyan.
- **Warning Message** displays a warning message on the LCD screen. Time message is displayed can be adjusted. Note: entering 0 for time will keep the warning on screen until the condition goes away or until it is cleared by the driver.
- **Illuminate bubble** Certain graphic templates have a digital value for which the background color will change in concert with the LED color. Note: when alternating LED color is selected, the first color selected (mouse left click) will be the bubble change color.
- **Show marker** for gauges that have pointers or bar graphs, a marker will appear at the warning set point so that the driver can have a reference to proximity to warning points.

Note: individual channel warnings that use the middle 10 LEDs will be overridden when a shift light is active. Also, the order of the alarms in the list indicates priority for LED and message warnings. To change an alarm priority, first select the alarm you wish to change, then use the Up and Down buttons in the window to change its position in the order.

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Gateway	ARM1 Actions LCD Dash LEDs data v Enable Action V Illuminate LEDs low w. Configure LEDs	ove 750 RPM pr. A gauge
SPS GPS	LCD Dash Warning Message LCD Gauge Warnings	
Steering Wheel	Gates V Display Message V Illuminate Bubble OK	
Math Channels	GAT Message Display Time: s V Show Marker Cancel	
Miscellaneous		Shift Lights
	Remove	
	LCDRACE	
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When you click the configure LEDs tab, a pop up window will appear with an image of the LCD dash. LEDs can be enabled and disabled by left clicking on the desired LED (right clicking will set the second color for alternating LED mode).



Configuring Shift Lights

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Gateway 2	Gates Name	Channel	Condition	Value	Delay (ms)	Edit			
GPS		Channel	Condition	Value	Delay (ms)	Edit Add		Shift Lig	jhts

In the alarms menu, click on the Shift Lights button to access the shift light menu.

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Telemetry	© Out	side to inside		 Start of band End of band 				Remove
Display	RPM Ban	ds					Test	
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ECU Gateway 2	3						Default PRS	
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	7	-						
Steering Wheel	8	-						
Math Channels	9					<u> </u>		ft Lights
	•	1				•	Clear Selection	
Miscellaneous								
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Options:

RPM channel – select the channel name for the shift light RPM.

Progressive Mode

Left to Right – progressive LEDs will turn on one at a time from left to right.

Outside to Inside – Progressive LEDs will turn on two at a time starting with the outside and progressing to the middle.

RPM bands

Start RPM - RPM value for the beginning of the set band

End RPM - RPM value for the end of the band

Note: LED progression will be equally divided over the entire band width.

Light Mode

Progressive - LEDs turn on one at a time over the entire range

Flashing - All 10 LEDs flash constantly

Light Color - select the LED illumination color for each band

Tach Marker – Adds a graphical indication on the screen for shift point location. This always places the marker at the beginning RPM value of the selected band, and maintains the same color as the selected LED color.

Note: Some screen templates will only allow a single marker and will default to the first band indicated to require a marker.

Test

Shows a graphical representation of the currently configured bands with a slide bar to show real time RPM simulation.

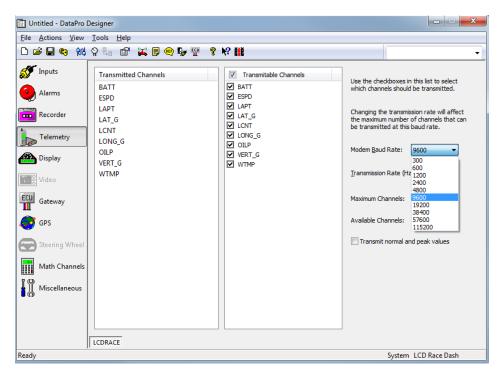
Recorder

In this menu, all channels will be shown in the right hand column. Checking the box will enable them to be recorded internally. In the left hand column, the record rate can be configured from 1 Hz to 1 kHz (1 to 1,000 samples per second). Information on the right hand side of the screen will keep track of the available recording time, number of recorded channels, and allow you to switch between Normal and other advanced recording modes. For the time being leave recording mode set at Normal.

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Inputs Channel Rec.Rate (Hz) BATT 1 ESPD 10 LAT_G 10 Diplay 0 WTMP 20 Math Channels WTMP Math Channels 100 Math Channels<					
Alarms Normatic (init) We have been been been been been been been be		음 🗳 🗳	s 🖡 🔍 🐓 🖫	? № III	-
Alarms ESPD 10 which channels should be recorded. Image: Recorder LAT_G 10 LAT_G Double-dick an item on the far left list to change its recording rate. Image: Nideo VERT_G 10 VERT_G Double-dick an item on the far left list to change its recording rate. Image: Nideo VERT_G 100 VERT_G WTMP 20 Image: Nideo 200 200 WITMP WTMP Recorder demonstrate. Image: Nideo 200 200 WTMP WTMP Recorder demonstrate. Recorder demonstrate. Image: Nideo 200 200 WTMP WTMP Recorder demonstrate. Recorder demonstrate. Image: Note 200 200 WTMP WTMP Recorder demonstrate. Recorder demonstrate. Image: Note 200 200 200 WTMP Recorder demonstrate. Recorder demonstrate. Image: Note 200 200 200 200 Recorder demonstrate. Recorder demonstrate. Image: Note 200 200 200 200 Recorder demonstrate. Recorder demonstrate. Recorder demonstra	🔊 Inputs				
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Steering Wheel Math Channels Math Channels Pre-trigger period: Maximum Runs: 100 Total Runs: 0			1000]	
Math Channels Miscellaneous LCDRACE Pre-trigger period: 0 s Post-trigger c5535 s Maximum Runs: 100 Total Runs: 0					
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Telemetry

If you have purchased the Pro Software Pack, and accompanying telemetry accessory hardware, you may utilize this screen to select channels to be output in RS232 serial data for transmission via modem to a remote computer network for analysis from pit lane via DataPro Telemonitor while the vehicle is on track. Baud rate for telemetry module and transmission rate for data channels will also be configured on the right hand side. If you do not intend to utilize the Telemetry feature, you may skip this section.

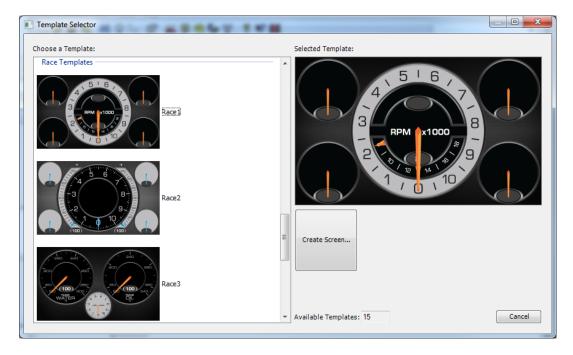


Display

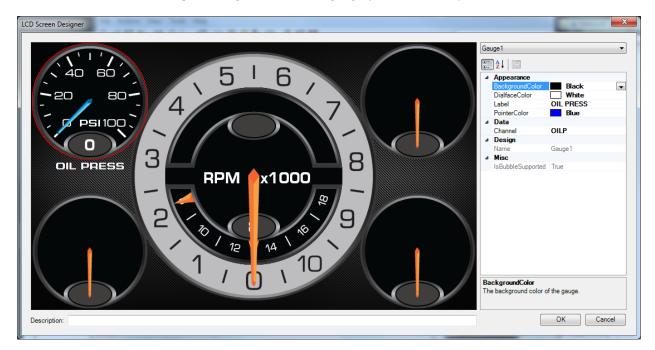
The display menu will allow configuration of graphic elements on the LCD Display screen. The main display menu will also allow setting day and night brightness settings in addition to setting the lap time message pop up duration. To add a new screen, click the "add" Button which will open a new window showing different template options.

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💕 Inputs	Template:					
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Video	Screen Gauge 1 Gauge 2 Gauge 3 Gauge 4 Gauge 5 Gauge 6 Gauge 7 Gauge 8 Gauge 9 Edit					
Gateway	<u>A</u> dd					
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Steering Wheel						
Math Channels	Cown					
Miscellaneous	LCD Brightness Enable Sponsor Screen					
	Day 80% Display Popup					
	Night 50% Message Display Time: 8 s					
	LCDRACE					
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Select the desired base template to begin configuring individual graphic elements. The following selections are available.



- **Appearance** adjusts the appearance of the selected gauge.
 - **Background** changes the background color of the gauge (black, white, or gray)
 - **DialfaceColor** changes the color of the artwork image (black, white, or gray)
 - **GaugeRange** changes the artwork range if needed.
 - **Label** Changes the text for the name of the gauge.
 - **PointerColor** adjusts the color of the pointer (orange, blue, or white)
- **Data** assigns a channel name to the artwork corresponding to the gauge artwork.
- **Design** shows the name or number of the gauge that is currently being configured.
- Misc Other details pertaining to the selected gauge (bubble enabled).



Video

For use with legacy systems, does not apply to configuring LCD Motorsport Display. If you are utilizing a DVL expansion module as part of your system, use the DVR Configuration Software included with that product.

ECU Gateway

This tab is used to configure CAN (Controller Area Network) inputs from an ECU (Engine Control Unit) or other CAN enabled device. There are a number of available pre-programmed protocols for popular applications that can be selected from the drop down menu. Alternatively, if your device is not shown, you may create a custom CAN message via the CAN Gateway Template Editor Application, which will produce a file that will appear for selection in this location once completed.

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Constraints Cons	Processed Channel Messages	ECU Protocol: Bosch MS3 Bosch MS4.3 DTA S Series EFT Euro-6 Euro-12 Emerald Import 1 W J1939 PF J1939 29-bit Life Racing NASCAR SECU Prostoke GT3 2002 R600 Race 2013 Std SEAT Eoro Cup SEAT Sport 2010 Stack TPMS - V7				
Miscellaneous		Selected Channels: 0				
LCDRACE						
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Once the desired protocol is selected, a list of available channels may be enabled for display and recording purposes. When a CAN channel is selected, it will show up in the left hand column and can be seen in the recording, alarms, and display tabs as available channels.

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Inputs Proc Alarms BOC Recorder WSI Telemetry Display Video EEP Gateway Steering Wheel Math Channels Image: Miscellaneous	Accessed Channel Messages OGT	ECU Protocol: J1939 Speed: Edit Protocol Use the checkboxes in this list to select which channel messages should be processed. Find Channel You may search for all or part of a channel name. Channel: Eind Selected Channels: 4				
Ready System LCD Race Dash						

In order to edit or create a CAN message; use the edit protocol tab which will open the CAN template editor. This window can be used to create and edit CAN messages as well as set peak recall settings for CAN channels.

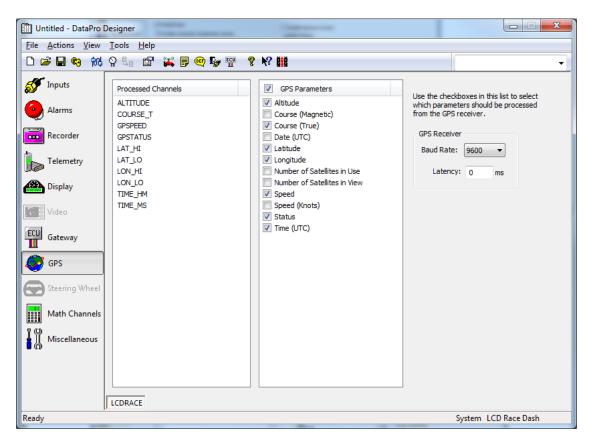
Setting CANbus Speed:

When utilizing the ECU CAN Gateway feature, in addition to selecting the protocol file and monitored channels it is necessary to set the CANbus speed as well. Consult the CAN data transmission specs from your CAN enabled device manufacturer to determine the appropriate setting. Failure to select a speed or selecting an incorrect speed setting will prevent proper operation of this feature.

땝 Stack Gateway Template Editor - J1939					_ 0	23
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	Bit Count: 8		 Intel Motorola 			
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		Units: C	•	Bit 2	Bit 1	Bit 0
	Type: Unsigned 🔻	Minimum: -40	С	2	1	0
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				18	17	16
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	Precision: 1.0 -			50	49	48
	Support out-of-range displ	av indication		58	57	56
	Support out-or-range dispr	-				
		OK	Cancel			
Messages: 6 Channels: 12	Selected 🖂 0x6EE	🕞 🛛 🖓 WTN	MP	Status		

The LCD dash is pre-configured to accept GPS data on Serial Input 1. This will allow for full NMEA sentences to be used as an input for data recording and display. There is also a setting to enable GPS lap timing.

Select the GPS parameters required for data logging and display from the list in the right column. The Baud Rate must be selected for the GPS receiver that is connected to the system. Failure to select the correct Baud rate will prevent this feature from operating correctly.



GPS

This tab adds GPS data from a GPS module into the channel list for display and logging.

Steering Wheel

This tab is used for configuring a steering wheel display and does not apply to LCD dash configuration.

Math channels

A number of Math channels are available as a default including calculated gear position as a function of engine and wheel speed, lap distance, and predicted lap timing. Brake bias is also available when brake pressures are configured as channel inputs. Enabling these features will allow use of these calculated parameters in display screens and logged data.

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Inputs Inputs Implements Implement	Gear Position	Enter wheel spee 1st MPH: 25 Descripi Lap dist	ed @ 5000RPM for ea 2nd 3rd 42 65 Please m	4th 80 ake sure your hardware support	s these features before enabling
Math Channels					
Miscellaneous					
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Miscellaneous

Terminating resistor – CAN messages require a 120 Ohm terminating resistor across the two wires in order to properly terminate the signal. The LCD Motorsport Display has a configurable built-in terminating resistor on both the CAN and the NET lines. Enable this terminating resistor if the LCD dash is the last module on the network to avoid wiring in a separate resistor.

Additionally, new firmware upgrades can be sent to the LCD dash when they become available, using this screen.

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が Inputs	Parameter	Setting			
Alarms	Enable internal termination of CAN bus 1 Enable internal termination of CAN bus 2				
Recorder					
Telemetry					
Display Display					
Video					
ECU Gateway					
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Steering Wheel					
Math Channels	Firmware Upgrade Firmware Version:				
Miscellaneous	Upgrade Package: Browse				
	Upgrade Once initiated, the upgrade process cannot be canceled!				
	LCDRACE MF				
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Saving a Configuration File

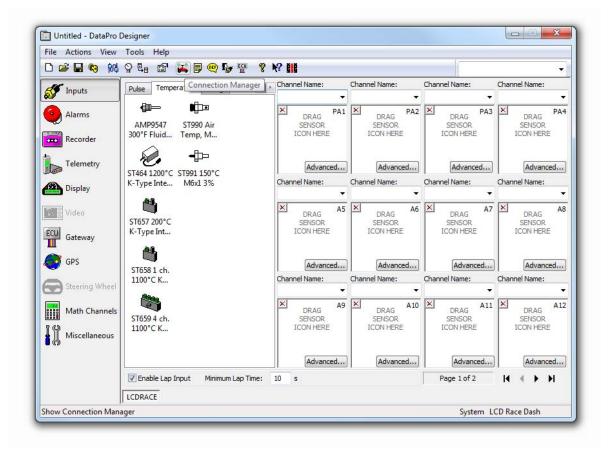
Once you have completed creation of your configuration file and set all desired parameters, you will want to save a copy of your work. To do so, go to the top left hand of the open DataPro Designer window and click File, and then select Save As in the drop down menu. Name your configuration file and then click OK to save your work.

At this time it is also recommended that you save / print a copy of the configuration report to keep with your vehicle logs / setup sheet for future reference. To do so, click the Report icon which will generate a text file detailing your system selections. From this screen you may either select Copy to move this information to your computer's clipboard to be pasted into another file such as a Word document, or Save which will allow you to create a name and select a location for the text file of this information which can be filed with other pertinent vehicle data kept on the computer.

Uploading a Configuration

Establishing Ethernet Connection:

Select the connection manager Icon.



Select the Add new connection option.

🗃 🖬 🍋	View Tools Help	P 🔍 🗣 🖞	? № ? Ш				
Inputs	Pulse Temperatur	e Voltage 4	Channel Name	Channel N	Name: Char	nnel Name: Ch	nannel Name:
	Pro Connection Manager	6×	10.000	m. [6]			
F All	Edit View Help	5 A					
		lame	Tag Connect	ed Download	Last Down.	MAC Addr.	IP Addr.
▶ _ ਜ	140523 LCD Rat	ew Connection	00:00:50	00:00 1	6d, 16:46:38	00-D0-C9-D7-0E-78	169.13.7.3
		m					•
/ · · · · · · · · · · · · · · · · ·	v connection			Vehicle Set:	DEFAULT	Connecti	
	v connection				Advanced)	Advanced	4
					Advanced)	Advanced	ions: 0

Enter the IP address of the dash you are programming.

🛗 Untitled - DataPro Designer				
File Actions View Tools Help				
다 🛋 🗣 🚧 유 🗞 🗃 💢 🖡 🧐	9 \$ ¶ ? \? 11			•
Inputs Pulse Temperature Vol	tage Channel Name: C	hannel Name: Char	nnel Name: Ch	annel Name:
DataPro Connection Manager	JE = 1	× ×		D XX A4
File Edit View Help				
Name	Tag Connected Down		MAC Addr.	IP Addr.
リークロージョン ICD Race Dash 140523 ICD Race Dash	00:00:50 00:00	16d, 16:48:07	00-D0-C9-D7-0E-78	169.13.7.3
	Name: LCD Race Dash IP Address:	OK Cancel		48 •• 12
Ready	 	cle Set: DEFAULT	Connecti	•
C (needy	Veni	CIE SEG DEFAULT	Connection	
	Advanced	Advanced	Advanced	Advanced
	nimum Lap Time: 10 s		Page 1 of 2	4 4)
Ready			System LCD	Race Dash

If a configuration has never been loaded onto the unit, the default screen will show the firmware revision level as well as the current IP address.

If a configuration is currently loaded, to show the software banner screen, press and hold S1 for 10 seconds.

LCD Motorsport Display Race Mode						
	Config	Name				
System Bundle: OS Image: OS: Graphics Engine: Graphics Bundle: Race Dash App: System FW:	0.0.3 1.4.2 6.5.0SP1 3.2 0.0.1 0.33 1.32	Pro Control: Data Logger: Accelerometer: Speedometer: Last Upd Mon 24 Nov 10:2 Notes:				
IP: 1	c9:d6:13:ce 92.168.1.3 12341234	Tue Nov 25, 201	4 11:53:27 AM			

To upload the configuration, click on the upload configuration button and click start.

🛄 Untitled - DataPro 🛙	Designer		
File Actions View	Tools Help		
🗅 🗳 🖬 🎭 🕅	유 🔩 🖆 🙀 🗦 🥶 🦻 🦞 !	? II	•
💕 Inputs	Upload Temperature Voltage	Channel Name: Channel Name:	Channel Name: Channel Name:
	<u> </u>	· · ·	
Alarms		DRAG PA1 DRAG PA2	DRAG DRAG
	AMP9547 ST990 Air 300°F Fluid Temp, M	SENSOR SENSOR ICON HERE ICON HERE	SENSOR SENSOR ICON HERE ICON HERE
Recorder			
Telemetry	- 🐱 🕂	Advanced	Advanced
Jø '	ST464 1200°C ST991 150°C K-Type Inte M6x1 3%	Channel Name: Channel Name:	Channel Name: Channel Name:
Display	K-Type Inte M6x1 3%		
Video	- Č	× A5 × A6	× A7 × A8
TZA 8 AIGEO	ST657 200°C	DRAG DRAG DRAG SENSOR	DRAG // DRAG /
ECU Gateway	K-Type Int	ICON HERE ICON HERE	ICON HERE ICON HERE
Sec. (1997)	ST658 1 ch.	Advanced Advanced	Advanced Advanced
Steering Wheel	1100°C K	Channel Name: Channel Name:	Channel Name: Channel Name:
G			× × ×
Math Channels	ST659 4 ch.	DRAG A9 A10 DRAG DRAG SENSOR	DRAG A11 A12 DRAG SENSOR SENSOR
Miscellaneous	1100°C K	ICON HERE ICON HERE	ICON HERE ICON HERE
		Advanced	Advanced
	Enable Lap Input Minimum Lap Time:	10 s	Page 1 of 2
	LCDRACE		
Create and upload syste	em configuration		System LCD Race Dash

DataPro Application

Downloading Data from a Logger

Registration

Before you may download data from a logger, you are required to register the logger's TAG number (serial #) with DataPro. Please note, this is a different operation from authorizing a pincode for the logger (which must be done prior to logger registration).

To register a logger's TAG select the **Download Manager...** option from the **Run Data** menu.



The **Download Manager** allows the user to register loggers and to edit the download track and session. The Manager also allows the user to specify post-download operations such as auto-calculations and alarms.

👼 Download Manager					
Download Track Folder Select Download Layout MYTRAK New Image: Speed and Time Compare Image: Speed and Time Compare Image: Change layout on download Vehicles Add Vehicle					
Vehicle Name	Session Folder	Tag	AutoCalc		
01 MyCar	080117JT -	1YYCL0V 🝷	STANDARD -		
Advanced >>		ОК	Cancel		

Under the Vehicles heading click the Add Vehicle... button. This will display the Add New Vehicle dialogue.

Add New	Vehicle	
Name:	MyCar	
Session:	080117JT	·
Tag:	1YYCL0V	ОК
Advanced	>>	Cancel

Enter a unique name for the vehicle to which the logger is fitted.

Specify a session folder name for the downloaded data from this logger in which to reside. Note, you may change the session folder name at any time prior to download.

Enter the logger's TAG/serial number. You can either type this number in manually or, if the PC is currently connected to the logger via a CANUSB connection, you can click the dropdown arrow and select **<Get...>** from the displayed list.

Now click the **OK** button to close the **Add New Vehicle** dialogue.

You may repeat this operation for however many vehicles from which you wish to download.

Then click the **OK** button on the Manager dialogue and click **Yes** on the **Save Changes** dialogue when prompted.

Downloading

Select the **Download Save Memory...** or **Download Erase Memory...** option from the **Recorder** menu, depending on whether or not you want the data to remain in the recorder after download. The following shows the **Download Save Memory** dialogue.

Recorder Download - Save Memory		
Active Connection: Canusb1	v	
Track: Session: MYTRAK	Change	
More >>		This box remains empty until a
Data will remain in Recorder memory after download.	Start	vehicle is connected and the Star button is clicked.
	Close	

Select the required connection from the **Active Connection** dropdown list. If you have an active Ethernet connection, then the currently connected vehicle names will appear in the **Active Connection** dropdown list. For legacy systems, however, the active connection should be set to **Canusb1**. Note, if you have unchecked the **Show Active Connection** option in the **Global Properties** dialogue, then the **Active Connection** dropdown list will not be present.

If you wish to change the track or session for a vehicle, click the **Change**... button (for more information please see <u>Changing Download Track and/or Session</u>). Please note that the Session, Tag and Vehicle Name boxes are not displayed on the download dialogue until the logger is connected and the **Start** button has been clicked. To start the download, click the **Start** button.

Changing Download Track and/or Session

You may change the download track and/or session folders with the **Download Manager** at any time prior to download. Clicking the **Change...** button in either of the download dialogues will display the Manager.

Changing the Download Track

To select a track folder that has already been created, just select the track from the **Download Track** dropdown list.

🐺 Download Manager			
	elect Download Lay		
Vehicle Name	Session Folder	Tag	AutoCalc
01 MyCar	080117JT 💌	1YYCL0V 💌	STANDARD -
Advanced >>		ОК	Cancel

In order to create a new track, simply click the **New...** button to the right of the **Download Track** dropdown list. Then enter your unique name for the new track folder when prompted. Remember to click the **OK** button when closing the Manager in order to save your changes.

Changing the Download Session

The download session folder is vehicle-specific, that is to say, you may define a different session folder for each registered vehicle. To change the session folder, simply double-click a session cell in the vehicle grid and enter a session name. You may also use the dropdown arrow button on the session cell to select a session that already exists or select the **New...** option, which will use a date as a session name (in the form of YYMMDD).

Auto-Calculations

Auto-calculations are calculations that are run on the downloaded data to create additional data channels such as DISTANCE. The default STANDARD batch calculation, which installs with DataPro, will create COMB_G, DISTANCE, G_RATIO, LONG_G and RADIUS channels. The Download Manager provides the user with options for the Post Download Operations including auto-calculations and alarms. Click the **Advanced** button on the Download Manager to access this functionality.

To select the same auto-calculation for all vehicles first make sure the **Same for all vehicles** checkbox, under the **AutoCalc** dropdown list, is checked, then select a calculation from the dropdown list.

To select a different auto-calculation for each vehicle first make sure the **Same for all vehicles** checkbox, under the **AutoCalc** dropdown list, is cleared, then select a calculation from the dropdown list cells within the vehicle grid.

Global Properties	\mathbf{X}
Channel Settings Track/Map Channel Group Distance Calculation Enter the speed channel that should be used in the distance calculation. Speed: WSPD V	25 Options Calculation Options
(OK Cancel Apply

The **DISTANCE** calculation uses the wheel speed channel. The wheel speed channel name may be different from the default **WSPD** depending on the system configuration you are using.

In order to change the wheel speed channel used in the **DISTANCE** calculation, first select the **Global Properties...** option from the **Run Data** menu, and then choose the **Calculation Options** tab where you will find a dropdown list of available wheel speed channels.

Alarms

Alarms are a special type of auto-calculation that may be run on downloaded data. The alarm calculation can provide you with a report of specific events that have occurred in the downloaded data. There are no default alarms installed with DataPro so to use this feature you will need to define an alarm. Click the **Advanced** button on the Download Manager to access this functionality.

To select the same alarm for all vehicles first make sure the **Same for all vehicles** checkbox, under the **Alarm** dropdown list, is checked, then select an alarm from the dropdown list.

To select a different alarm for each vehicle first make sure the **Same for all vehicles** checkbox, under the **Alarm** dropdown list, is cleared, then select an alarm from the dropdown list cells within the vehicle grid.

For help with defining alarms and viewing alarm reports please refer to the Alarms section in this manual.

Using Alarms

The Alarms option is found on the Run Data menu. Simple alarms may be created using the basic alarm interface,

Run	Data Recorder Layou	t Tools Help
,	Download Manager	Alt+Shift+D
•	Log Book	Ctrl+L
R	Auto Reset 0 Manual Reset 0	Alt+M
	Set Run O <u>f</u> fset Set <u>B</u> eacon Offset	Alt+B
	Math C <u>h</u> annels	Alt+C
۹	<u>A</u> larms	
N	Run Mar <u>k</u> ers	
,Q	Run <u>R</u> ecalibration	
చి	Create <u>M</u> ap	Ctrl+M
-	Global Properties	Alt+P

Defining an Alarm

Click the New... button and, when prompted, enter a unique name for the alarm. The alarm is actually a calculated channel and therefore, its name must conform to the channel name restrictions of 8 alphanumeric characters or less. The alarm name must also be unique to the other calculation names that exist on the PC.

enabled by default. However, if you wish to create more complex alarms, the advanced alarm editor can be enabled by checking the **Advanced Alarm** Editor option in the Global Properties dialogue.

Alarms					×
Alarms		Alarm Limit Variat	oles:		
HIOILP HIREVS HIWSPD HIWTMP MYARM OVRBOOST OVRBOST1	New Edit Delete	Variable	Value	Units	
Description: Test for basic VI editor	Execute				
Execution Status:	· ·				
Execution Status.					
View Report				Close	

Once a new name has been defined for the alarm, you may enter an optional description for the alarm. This user-specified description will appear in other alarm dialogues.

Edit Alarm - MYARM			
Channel: ESPD 🛩	Condition: Above	Value:	BPM
Delay (s): Ga 0.03	te	~	
Description:			
Test for basic UI editor.			~
			~
		OK	Cancel

In **Basic Alarm Editor** mode, you simply select a channel, a condition and a value for the alarm. For example, here an alarm is generated if the ESPD channel data goes above 3000 RPM for at least 30ms.

You may gate an alarm by checking the Gate box and selecting another alarm from the dropdown list. In this case, the alarm will only be generated if both alarm conditions are true.

If you do not require a delay, just leave the textbox empty.

In **Advanced Alarm Editor** mode, you define one or more events for which an alarm will be generated. To do this click the **Add...** button to the right of the **Alarm Events** list. This shows the **Add New Event** dialogue.

Edit Alarm - HIWSPD			
Alarm Events Definition:			
Boolean Expression	Duration (s) Chan.	Value	Add
WSPD > MAXWSPD	WSPDTIME WSPD	max	Edit
Description:			Delete
		ОК	Cancel

The alarm report can provide you with a maximum, minimum or average value of a channel each time an alarm event occurs. Select the **Event Value Channel** from the dropdown list and choose a **Maximum**, **Minimum** or **Average** type. Note, for the channel dropdown list to be populated, you must first have performed an **Upload** using **Designer** on this PC or have the run you want to process already selected. In the example shown, the maximum value of the **WSPD** channel will be stored over the period when the event expression is true.

If you require the **Threshold Duration** (the time for which the **Boolean Expression** must be true before an event is generated) to be different for each vehicle then you will need to define an alarm limit global variable. Alarm Limit Global Variables are defined using the **Alarm Editor** dialogue (see Alarm Limit Global Variables). Important, these global variables need to be defined <u>before</u> you add an event. If the Threshold Duration is the same for all vehicles then you may check the **Constant** checkbox and enter a constant value for the threshold duration in seconds.

Edit Alarm Event	
Alarm Event Expression Boolean Expression (evaluates to True	or False):
WSPD > MAXWSPD	
Expression Components:	Content:
Calculations Grim Channels Grim Functions	
⊕	Description:
Event Value Channel: WSPD V Maximu	Im Variable:
A single value is stored for the duration when O Averag	😳 🔽 Constant
the boolean expression is true.	WOLD IME S
	OK Cancel

Enter an **Alarm Event Boolean Expression** using the **Formula Components** tree control to help you. In the above example, the **WSPD** channel value must be greater than the **MAXWSPD** alarm limit global variable the specified **WSPDTIME** duration before an alarm event is generated.

Defining Alarm Limit Global Variables

Right-click on the **Alarm Limit Variables** folder icon in the **Expression Components** tree. Then select **New Alarm Limit Variable**... option from the popup menu. This will display the **Add Alarm Limit Variable** dialogue. Enter a unique **Name** for the variable, this must be different from any calculated or recorded channel names. Select the limit **Quantity** and **Units** from the dropdown lists. You may also enter some **Help** text for the variable that will be displayed in various alarm dialogues. Then click the **OK** button.

Expression Components:	Content:
WSPDTIME Galculations Galculations	Description:

Edit Alarm Limit Variable	
Name: MAXWSPD	Quantity: Speed Units: MPH
Help (optional text describing purp	pose of variable):
Alarm limit for high wheel speed.	
	OK Cancel

Setting Alarm Limit Variables

Alarm limit global variables are set using the **Download Manager**. Click the **Advanced** button. Under the **Post-Download Operations** section select the required **Alarm** from the dropdown list. The Manager dialogue will expand its vehicle grid to show the alarm limit global variable columns.

丈 Download Manager					
MYTRAK V New	elect Download Layo Driver Activity Change layout on (~			
Vehicle Name	Session Folder	Tag	AutoCalc	MAXWSPD MPH	WSPDTIME s
01 800SR Advanced <<	080117JT	1YYCLØV 💌	STANDARD	350.0000	2.0000
Advanced Post Download Operations AutoCalc: Alarm: HIWSPD Same for all vehicles Same for all vehicles	Vehicle Set DEFA Change	ULT]			

You may now double-click on the variable cells within the grid to set values.

Alarms				
Alarms		Alarm Limit Variat	bles:	
HIDILP HIREVS HIWSPD HIWTMP MYARM OVRBOOST OVRBOST1	New Edit Delete	Variable	Value	Units
Description:				
Test for basic UI edi	itor.			<
Execution Status:				
View Report				Close

Executing Alarms

You may also manually execute an alarm. Select the run for which you want to execute an alarm using DataPro's Run Selector control.

Select the alarm from the list of available alarms.

Then, if global variables are being used within the alarm definition, set the alarm limit global variable values by double-clicking the cells in the grid.

To execute the alarm, click the **Execute** button.

Viewing Alarm Reports

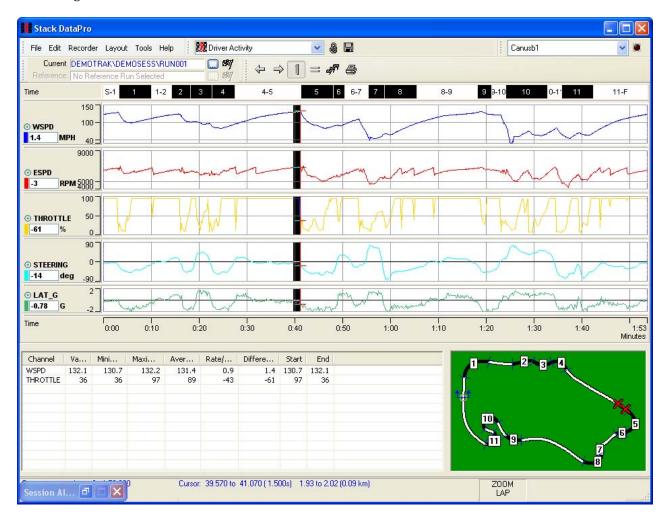
Alarm reports are viewed by clicking the **View Report...** button.

Session: Statistical Sum Include DEMOSESS Run Lap		e ession un	Show ' O Lo O Hig	V <mark>alue</mark> ngest Dui ghest Valu west Valu	ation ie	hannel: All Channels	Car Details Name: Tag: 1	20WJ21				
				KA RU	MOSESS	UN001 UN001		Events 6 2 2 2 2	Chan. ESPD ESPD ESPD ESPD ESPD	Duration 01.50 01.50 00.70 01.50 01.30	D max=6909RPM D max=6909RPM D max=6878RPM D max=6909RPM	
arm Eve											Exclude 0/I L	aps
Run	Date/					Lap	Chan		start	Duration	Value	
001 001	Sat Ja Sat Ja					002 002	ESPD ESPD		40.550 1:18.250	00.700 00.700	max=6878RPM max=6898RPM	
	Sat Ja		2012/02/02		NUNCSOF	002	ESPD		39.570	01.500	max=6909RPM	
	Sat Ja	1993 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 -	and the second second		- North States and States an	003	ESPD	0	1:18.670	00.500	max=6888RPM	
0.2426	Sat Ja					004	ESPD		31.770	00.600	max=7003RPM	
001	Sat Ja	n 01	13:00	0:00	1994	004	ESPD		39.670	01.300	max=6922RPM	
arm Defi		KI 1114	es true f	ar a du	ration of a	t least 0.5	000 °		Do	ouble-click list item t	o highlight alarm event on sl	trip cl

Use the **Session** tree control to select the track and session you are interested in. If a session contains data that has an associated alarm event, the session icon is shown as an alarm bell .

Use the settings in the **Statistical Summary** to show more or less information about the alarm events that have occurred.

Double-click an **Alarm Event** list item to have it automatically selected and highlighted within your DataPro analysis layout. The Session Alarm Report window is minimized to allow easy viewing of a strip chart as shown in the image below.



Title:	Stack DataPro	Alarm R	eport				ſ	Templates	
	Over-Rev Alam							Current Template:	
Header:	Uver-Rev Alam	n							~
- Include	e								
🗹 Sta	atistical Summary	Log	go:			Brow	se	Save	Delete
A	Events	Zo	om: 100%						
_		20		· · ·				Print	Done
Preview:									
			:	stack	DataPr	o Alarm Repo	ort		
	120WJ21			DSESS					
Alarm ESPD	• Definition > 6800.0000	a No Un			a durat	ion of at lea	st 0.5000	s.	
Tag: Alarm ESPD Stati	Definition > 6800.0000 stical Summ	s No Un ary	itsS tr	le for			st 0.5000	s.	
Tag: Alarm ESPD Stati Item	Definition > 6800.0000 stical Summ E	s No Un ary vents	itsS tru Chan.	le for	ration	Value	st 0.5000	s.	
Tag: Alarm ESPD Stati Item DEMOS	e Definition > 6800.0000 stical Summ E ⁻ ESS	s No Un wary vents 6	itsS tru Chan. ESPD	le for	ration 01.500	Value nax=6909RPM	st 0.5000	s.	
Tag: Alarm ESPD Stati Item DEMOS RUNOO	e Definition > 6800.0000 stical Summ ESS 1	s No Un vary vents 6 6	itsS tru Chan. ESPD ESPD	le for	ration 01.500 01.500	Value nax=6909RPM nax=6909RPM	st 0.5000	s.	
Tag: Alarm ESPD Stati Item DEMOS RUN00 LAP00	e Definition > 6800.0000 stical Summ E ⁻ ESS	s No Un ary vents 6 2	itsS tru Chan. ESPD	le for	ration 01.500 01.500 00.700	Value nax=6909RPM	st 0.5000	s.	
Tag: Alarm ESPD Stati Item DEMOS RUN00 LAP00 LAP00	• Definition. > 6800.0000 stical Summ E· ESS 1 2,RUN001	s No Un very 6 6 2 2	itsS tru Chan. ESPD ESPD ESPD	le for	ration 01.500 01.500 00.700 01.500	Value max=6909RPM max=6909RPM max=6878RPM	st 0.5000	s.	
Tag: Alarm ESPD Stati Item DEMOS RUN00 LAP00 LAP00 LAP00	Definition 6800.0000 stical Summer ESS 1 2,RUN001 3,RUN001	s No Un very 6 6 2 2	itsS tro Chan. ESPD ESPD ESPD ESPD ESPD	le for	ration 01.500 01.500 00.700 01.500	Value max=6909RPM max=6909RPM max=6878RPM max=6878RPM max=6909RPM	st 0.5000	s.	
Tag: Alarm ESPD Stati Item DEMOS RUN00 LAP00 LAP00 LAP00 Alarm	<pre> Definition. > 6800.0000 stical Summ E ESS 1 2,RUN001 3,RUN001 4,RUN001</pre>	s No Un very 6 6 2 2	itsS tro Chan. ESPD ESPD ESPD ESPD ESPD	le for Du	ration 01.500 01.500 00.700 01.500	Value max=6909RPM max=6909RPM max=6878RPM max=6878RPM max=6909RPM	st 0.5000 Duration	S. Value	
Tag: Alarm ESPD Stati Item DEMOS RUN00 LAP00 LAP00 LAP00 Alarm Run 001	<pre>> Definition. > 6800.0000 stical Summe ESS 12 2, RUN001 3, RUN001 4, RUN001 • Events Date/Time Sat Jan 01.</pre>	s No Un eary vents 6 2 2 2 2 13:00:	itsS tru Chan. ESPD ESPD ESPD ESPD ESPD 00 1994	le for Bu Lap 002	ration 01.500 01.500 01.500 01.500 01.300 Chan. ESPD	Value max=6909RPM max=6878RPM max=6878RPM max=6922RPM start 40.550	Duration 00.700	Value max=6878RPM	
Tag: Alarm ESPD Stati Item DEMOS RUN00 LAP00 LAP00 LAP00 Alarm Run 001 001	Definition ≻ 6800.0000 stical Summ E* ESS 1 2,pUN001 3,PUN001 4,PUN001 Events Date/Time Sat Jan 01 . Sat Jan 01	s No Un vents 6 2 2 2 13:00: 13:00:	itsS tro Chan. ESPD ESPD ESPD ESPD ESPD 00 1994 00 1994	le for Bu Lap 002 002	chan. ESPD ESPD Classical ESPD ESPD	Value max=6909RPM max=6909RPM max=6909RPM max=6922RPM start 40.550 01:18.250	Duration 00.700 00.700	Value max=6878RPM max=5838RPM	
Tag: Alarm ESPD Stati Item DEMOS RUN00 LAP00 LAP00 LAP00 LAP00 Alarm Run 001 001 001	Definition. > 6800.0000 stical Summ. ESS 1 2,RUN001 3,RUN001 twents Bate/Time Sat Jan 01. Sat Jan 01.	s No Un eary vents 6 2 2 2 13:00: 13:00: 13:00:	itsS tru Chan. ESPD ESPD ESPD ESPD ESPD 00 1994 00 1994	Lag Du Lag 002 002 003	ration 01.500 00.700 01.500 01.300 Chan. ESPD ESPD ESPD	Value max=6909RPM max=6909RPM max=6909RPM max=6909RPM max=6922RPM Start 40.550 01:18.250 39.570	Duration 00.700 01.500	Value max=6878RPM max=6898RPM max=6909RPM	
Tag: Alarm ESPD Stati Item DEMOS RUN00 LAP00 LAP00 LAP00 Alarm Run 001 001 001 001	Definition ≻ 6800.0000 stical Summ E* ESS 1 2,pUN001 3,PUN001 4,PUN001 Events Date/Time Sat Jan 01 . Sat Jan 01	s No Un ary vents 6 2 2 2 13:00: 13:00: 13:00: 13:00:	itsS tro Chan. ESPD ESPD ESPD ESPD ESPD 00 1994 00 1994 00 1994	Lap 002 003 003	Chan. ESPD ESPD ESPD ESPD	Value max=6909RPM max=6909RPM max=6909RPM max=6922RPM start 40.550 01:18.250	Duration 00.700 00.700	Value max=6876RPM max=6896RPM max=6909RPM max=688RFM	

Run Selector Context Menu

Additional Selected Run Information

Right-click on the Run Selector toolbar to show a context menu.



Selecting either of these options will show or hide additional selected run information such as the vehicle name registered with the logger that was used to acquire the currently selected run.

Active Connection Dropdown List

Selecting a Logger Connection

Both DataPro and DataPro Designer have an **Active Connection** dropdown list within their respective toolbars. All the Recorder menu options in DataPro require you to have an active connection selected in this dropdown before communication can take place. This also applies to the Calibrate, Chat and Upload options within DataPro Designer.



On legacy systems, when the CAN USB adapter is plugged into the PC, the active connection should show **Canusb1**.

For an LCD Motorsport Display, the active connection should show "LCD Race Dash". The text will be black once a connection has been established. DataPro receives connection details for modules from DataPro Designer. If an

Printing an Alarm Report

Click the **Print...** button on the **Alarm Report** dialogue.

Here you may customize the report by adding a report title, header and logo bitmap to the printed document. The changes you have made can be saved in a template to be used on other alarm reports.

active connection has not been made, it is possible the IP address of the module has changed. To access the connection manager go to tools> connection manager to view and/or edit the active connection.

Where only the CAN USB interface is being used, the active connection dropdown list may be hidden by unchecking the **Show Active Connection** option in **Global Properties**.

Using Channel Groups

Run	Data Recorder L	ayout	Tools	Help
7	Download Manager.	A	lt+Shift	:+D
•	Log Book		Ctr	′l+L
R	Auto Reset 0 Manual Reset 0		Alt	:+M
	Set Run O <u>f</u> fset Set <u>B</u> eacon Offset		Al	t+B
	Math C <u>h</u> annels		Alt	:+C
٩	<u>A</u> larms			_
R.VI	Run Mar <u>k</u> ers			
s S	Run <u>R</u> ecalibration			_
ల	Create <u>M</u> ap		Ctrl	HM
ľ	Global Propertie <u>s</u>	10.7	Al L P II	t+P -

The Channel Groups feature allows you to set the units, decimal places and y-axis range of a group of channels. To configure channel groups, select the **Global Properties** option from the **Run Data** menu. Then select the **Channel Groups** tab.

Global Properties		X
Channel Settings Track/Ma Channels: BATT COMB_G DISTANCE ESPD FUELP G_RATIO OILP OILT RADIUS ROLLTIME STEERING THROTTLE TIMELINE TIMELINE TIMELINE COMB_G COMB_C COMB_G COMB_G COMB_C CO	ap Channel Groups Options Calculation C Groups: Acceleration New Gro LAT_G LONG_G Delet	bup
	OK Cance	el Apply

Create a new group by clicking the **New Group...** button and then entering a unique name for the group.

Add data channels to a group by dragging the channel name from the left list to the required group on the right. In the above example, an Acceleration group has been created and the LAT_G and LONG_G are members of this group.

Global Properti	es 🔀
Channel Settings Channels: BATT COMB_G DISTANCE ESPD FUELP G_RATIO LONG_G OILP OILT RADIUS ROLLTIME Groups: Acceleration RPM	Track/Map Channel Groups Options Calculation Options Units: Colours Decimals: Current 2 Period Filter Type: None Amount: 1 Select 'Acceleration' Group to edit LAT_G Units and Decimals.
	OK Cancel Apply

Now when setting channel properties such as units or decimal places, you would select the Channel Group from the Groups list.

Strip Properties	
Axis Settings Channel Selection Line Styles Fo	ont
Y Axis Title: ☐ Show Title	Colours Background Gridlines
Limits Channels: BATT	
LONG G TRANSRPM-DIFF Min -2.998	G
Groups:	
Acceleration Select 'Acceleration LONG_G Max and	
Where do I set Channel Filters, Colors, Units and D	Decimals?
	DK Cancel Apply

Likewise, when you set the y-axis limits for a Strip Chart, just select the group name from the Groups list.

Math Channels

Creating a Math Channel

Math channels are data channels created from recorded data by applying a mathematical formula. These channels can be selected and displayed on layouts just the same as recorded data channels. To create a math channel, select the **Math Channels...** option from the **Run Data** menu.

Run Data Recorder Layo	out Tools Help
Download Manager	Alt+Shift+D
👇 Log Book	Ctrl+L
Auto Reset 0	Alt+M
Set Run O <u>f</u> fset Set <u>B</u> eacon Offset	Alt+B
Math Channels	Alt+C
Alarms	_
🕅 Run Markers	
Run <u>R</u> ecalibration	
<mark>න</mark> Create <u>M</u> ap	Ctrl+M
Global Propertie <u>s</u>	Alt+P

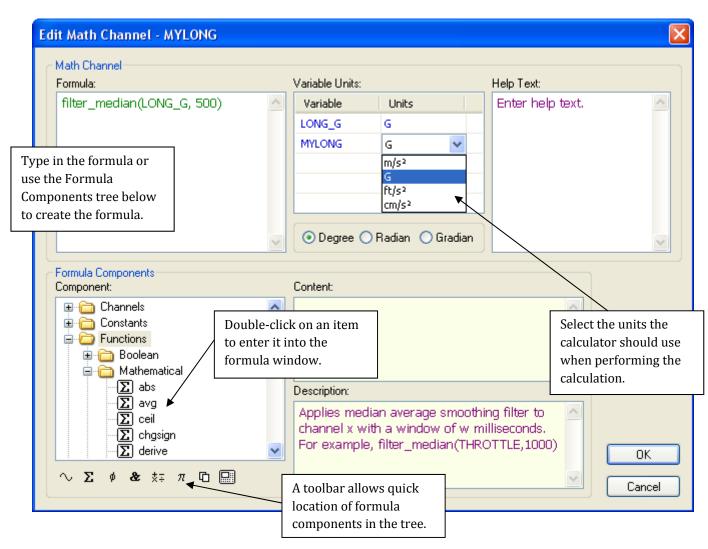
Then click the New... button. This will display the Math Channel Wizard.

Math Channe	Wizard - Select Item 🛛 🔀			
Welcome to the Math Channel Wizard! This wizard will help you create a new Channel or Batch Calculation. Please select the item you want to create: Channel Calculation Batch Calculation 				
	< Back Next > Cancel			

A batch calculation allows you to run a number of calculations, one after the other.

Follow the instructions in the wizard to create a new math channel. The wizard will ask for a unique name to associate to the channel and the physical quantity the data channel is measured in.

Once, you have completed the wizard, the math channel editor is displayed.



Executing a Math Channel

For math channel data to be available, you must first execute the calculation. Select the run for which you want the math channel, and then click the **Execute** button in the **Math Channels** dialogue. To have your math channel calculation(s) executed automatically upon data download, please see the section on **Auto-Calculations** in this manual.

Log Book

Configuring the Log Book Parameters

The Log Book is a powerful relational database that allows you to store, search and compare information about vehicles, races, tracks, weather conditions or any other parameter you wish to record and associate with recorded data.

Select the **Configure Log Book...** option from the **Tools** menu.

Tools Help 2	nt DEMOTRAK
Configure Log Book	
条 Search Log Books	Ctrl+S
Designer	Alt+D
螨 <u>R</u> unManager	
Connection Manager	
🐀 IeleMonitor	

The **Log Book Configuration** dialogue allows you to customize the Log Book by adding parameters and categories of your choice.

Click the **Add**... button to add a **Category** or **Parameter** to the Log Book.

Add Parameter/Category 🛛 🔀						
Category:						
My Category						
Parameter:						
My Parameter						
OK Cancel						

🗟 Log Book Configuration 🛛 🛛 🔀							
👘 Eng	jine Vehicle	Chassis					
📑 🖡 Track	🕄 Weather 🛛 Rear	🌮 Transmission					
🔘 Tires	🔲 🛄 Hotel 🛛 🖋 Shocks	: 💼 Weight					
Choose wh	nich parameters are used within t	he Log Book					
	Parameter	Show 📥					
► F	Rear Pressure						
F	Rear Temp						
F	Runs						
Г	Tire Model						
Г	Tire Size						
5	Vheel Size						
Parameter/Category Add Delete							
	OK Cancel						

Similarly, click the **Delete**... button to remove categories and/or parameters.

To hide or show parameters in the Log Book, select the required Category tab then check or uncheck the parameter in the **Show** column.

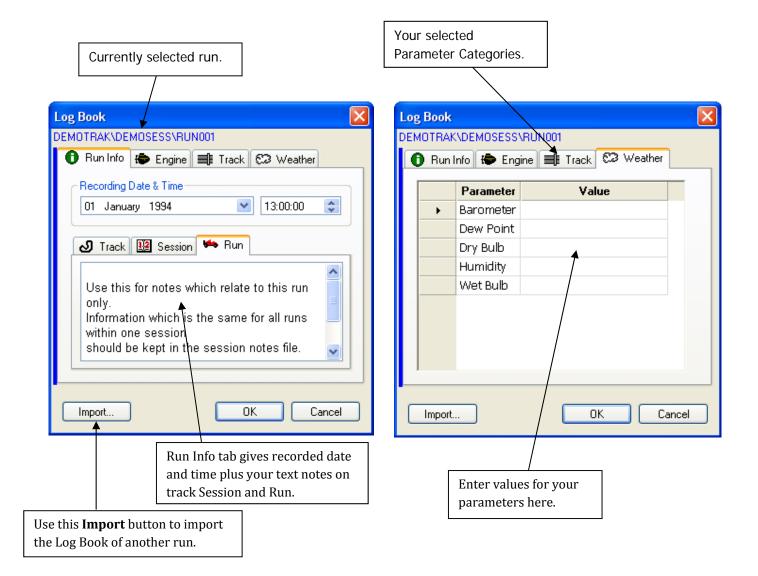
Viewing the Log Book

Rur	Data Recorder Layou	t Tools Help
7	Download Manager	Alt+Shift+D
•	Log Book	Ctrl+L
R	Auto Reset 0 Manual Reset 0	Alt+M
	Set Run O <u>f</u> fset Set <u>B</u> eacon Offset	Alt+B
	Math C <u>h</u> annels	Alt+C
٥	<u>A</u> larms	
N	Run Markers	
,Q	Run <u>R</u> ecalibration	
ఎ	Create <u>M</u> ap	Ctrl+M
P	Global Properties	Alt+P

The Log Book is fully integrated into the DataPro software. The Log Book may be selected as a pane within any layout. The Log Book is also displayed within the Run Selector dialogue and the RunManager application to help you find the run you're looking for.

To edit the Log Book, select the Log Book... option from the Run Data menu.

Note, the **Options** tab of the **Global Properties** dialogue also allows you to have the Log Book automatically displayed at data download.



Comparing and Searching Log Book Data



Select the **Search Log Books...** option from the **Tools** menu to access the Search & Compare dialogue.

Run	Session	Track	Date $ abla$	Time ∇	Intermediate	Location	Actual Altit	ude
001	DEMOSESS	DEMOTRAK	01/01/1994	13:00:00				
001	DEMO	RACEPAK	22/10/2006	18:04:28				
001	070907DD	EARLVILL	07/09/2007	15:41:00	\backslash			
001	070908DD	EARLVILL	08/09/2007	09:10:00	\backslash			
003	070907DD	EARLVILL	08/09/2007	15:18:00	\backslash		278	
002	070908DD	EARLVILL	08/09/2007	15:18:00			278	
001	070909DD	EARLVILL	Edit Log Boo	ok		Tri-State Raceway	,	
002	070909DD	EARLVILL	Filter					
003	070909DD	EARLVILL	Clear	×			<u>L_</u>	
005	070909DD	EARLVILL	Select As Curr		_	Click column		
004	070909DD	EARLVILL	Select As Can Select As Refe			header to sort		
006	070909DD	EARLVILL	0970972007	17:24:00		columns.		
001	071006DD	RICHMOND	14/09/2007	11:14:00				
002	071006DD	RICHMOND	14/09/2007	13:45:00	Right-clic	k context		
003	071006DD	RICHMOND	14/09/2007	16:24:00	_	es access to		
004	071006DD	RICHMOND	15/09/2007	11:45:00	editing an	d searching		
005	071006DD	RICHMOND	27/09/2007	13:19:00	features.			
006	071006DD	RICHMOND	27/09/2007	16:09:00				
007	071006DD	RICHMOND	05/10/2007	11:55:00				
008	071006DD	RICHMOND	05/10/2007	14:06:00	All	Log Book entries		
					pre	esented in spreads	sheet	>

001	070908DD	FARI VILI	08/09/2007	09.10.00							
Filte	Filter Runs - Last Runs									2	
Filter	r Criteria:										
Pa	arameter		Condition	Min/Value	M	lax					-
Ru	n Date		Between	10/01/2008		/01/200)8		*		
Ru	Run Time		Greater Than 13:28:18			<	Janu	ary	2008	3	>
Hu	Humidity		Greater Than 85		- M	on Tue	Wed	Thu	Fri	Sat	Su
						31 1	2	3	4	5	6
						7 8	9	10	11	12	13
					4 15 21 22	16 23	17 24	18 25	19 26	20 27	
Load/Save Criteria			Clear Selec	cted Item	L 2	28 29	30	31	1	2	3
004	071006DD	RICHMON) 15/09/2007	11:45:00		4 5	6	7 20 /0	8	9	10
005	071006DD	RICHMONE) 27/09/2007	13:19:00		100	lay: 1	29/0	1/20	000	

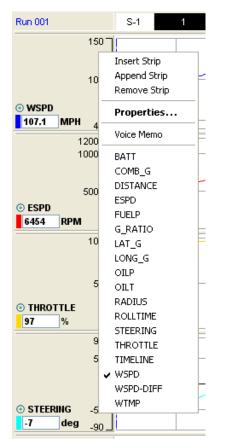
Right-click any row in the spreadsheet to display the popup menu. For searching, select the **Filter...** menu item.

A maximum of five filter conditions can be set up on any of the Log Book parameters. For popular searches, the filter criteria can be saved for easy access later.

Hints, Tips & Tricks

Shortcut for Adding Channels to a Strip Chart

Right-click the Strip Chart Y-axis, then select from the list of channels in the popup menu. You may select or deselect channels from this list.



Shortcut to Strip Properties

Right clicking on the channel name or value box within the Y-axis of the Strip Chart will display the Strip Properties dialogue.

Calibrating Sensors

Some sensors require calibration of a zero point, and the internal g meter will also require a vehicle specific calibration in order to accurately interpret any offset as a result of installation orientation.

The following channels will require calibration of a zero point. In order to know what sensors will require calibration, the standard DataPro Designer channel names must be used as indicated. The zero point for the g meter and all of the following sensors will occur during this process

DAMPERFL
DAMPERFR
DAMPERRL
DAMPERRR
GYRO_X
GYRO_Y
GYRO_Z
LAT_G
LONG_G
PEDAL
PEDAL2
STEERING
THROTTLE
VERT_G

To enter calibration mode, press S3 and then press S4 within 1 second.

The left and right side LEDs will now be pulsing yellow.

Pressing S3 will capture the zero position for any of the channels listed above. Be sure that the vehicle is on a flat, smooth surface to ensure accurate sensor calibration.

Once the zero values have been set, the LEDs on the left and right will pulse blue. Now it will be required to calibrate straight line acceleration to optimize the g meter calibration. Note: this step can be skipped by pressing S4, but the g meter calibration will not be as accurate. Once the vehicle is ready for this acceleration, press S3 (LEDs will now pulse red) and accelerate the vehicle at a rate of 1/3 of a g. Once the acceleration is threshold is reached, the LEDs on the side will pulse green for 10 seconds to indicate successful calibration.

Upgrading / Updating Your Display

It may be necessary to update the firmware in order to access newly released features and capabilities. The firmware upgrade process can be accessed in the Misc. tab of DataPro Designer.

🔝 Untitled - DataPro Designer								
<u>File Actions View T</u> ools <u>H</u> elp								
다 🖆 🖬 🤫 🚧 유 🖫 🖆 🙀 🖗 🥵 뗖 🤗 🕅 🗸								
が Inputs	Parameter	Setting						
	Enable internal termination of CAN bus 1							
Alarms	Enable internal termination of CAN bus 2							
	Car Number	1 🔹						
Recorder	Obtain an IP address automatically	×						
Televenter	Static IP Address	0.0.0.0						
Telemetry								
Display								
+ y								
Video								
rou								
ECU Gateway								
Ten								
Gateway 2								
GPS GPS								
	Firmware Upgrade							
Steering Wheel	Current Version: unknown							
Math Channels								
0000	Browse							
Miscellaneous	Upgrade Once initiated, the upgrade process cannot be cancelled!	Factory Reset						
		r actory redet						
Ready		System LCD Race Dash						

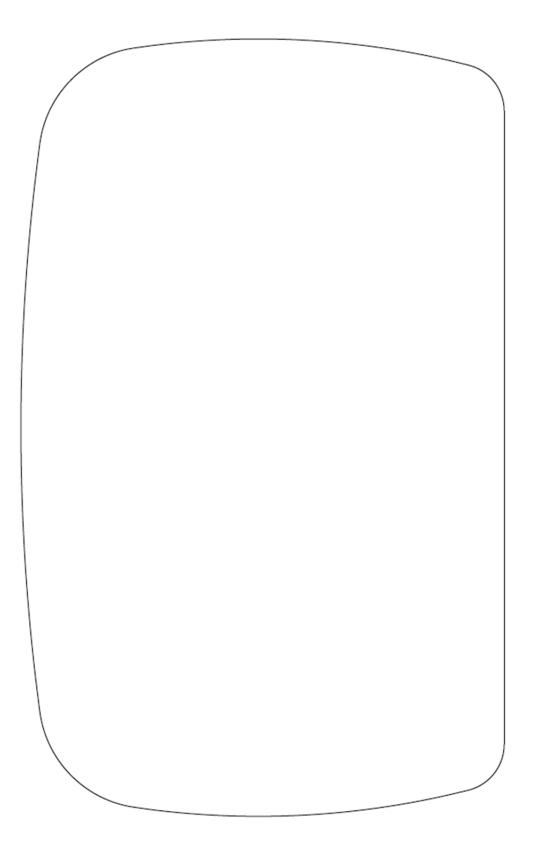
When a connection is made to an LCD dash, the current version number will be reported in the current version field.

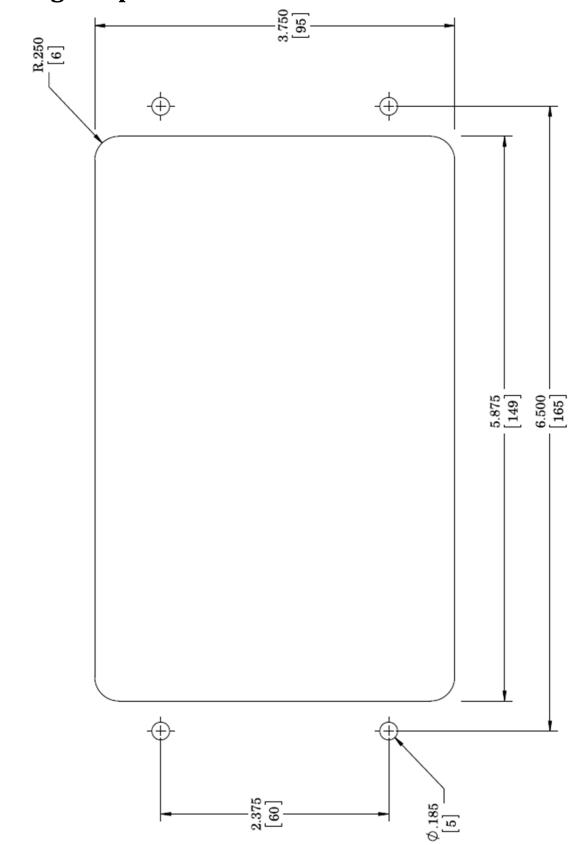
Next, click the browse button and point to the firmware file.

Finally, click the Upgrade button to begin the process.

Note: Once the upgrade button has been selected and the upgrade begins, power to the system must be maintained until the update has completed. There will be an indication on the display that an upgrade is in process. This process will take several minutes to complete.

Cutting Template for Flush Mount





Cutting template for "Face Forward" Mount