
STACK
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STACK
Data
Acquisition
2009
...when only the best will do!

STACK PRODUCT RANGE

Introduction to the Stack Product Range

Whatever your data acquisition requirements, Stack can supply a full turn-key solution, comprising compact and rugged bespoke hardware, specialist interfaces for seamless system integration and a comprehensive suite of software tools to facilitate the collection, analysis and organisation of data. We believe that Stack Data Acquisition Systems are the easiest to use and the most comprehensive and flexible professional Data Systems available at any price. Listed below are the principal system components...

Dash-Loggers

Stack Dash-Logger Systems are our most popular Data Acquisition solution. We recognise that not everyone has a requirement for a high number of data channels, or the luxury of a full-time Data Engineer, but may still require instant feedback and logging of monitored vehicle paramters. It may also be the case that your vehicle does not have enough space for a large engineering system (such as a motorcycle).

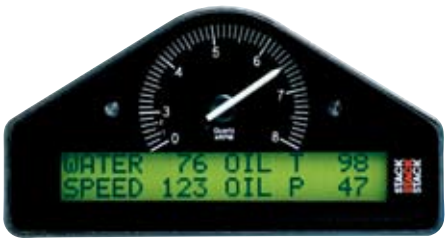
In such circumstances a Dash-Logger, which comprises on-board recording and monitoring of 8channels (expandable to 16+) can provide the optimum solution.

Engineering Systems

Stack Engineering Systems are built up from Modular Hardware components (Modules), all of which are lightweight, rugged, shock protected, sealed to IP68 and small enough to fit the palm of your hand.

Employing a modular architecture enables you to specify and construct your own data acquisition system to suit your data requirements and budget. Should your requirements change, simply upgrade by adding another module. Systems available to monitor between 4 - 256 channels of data.

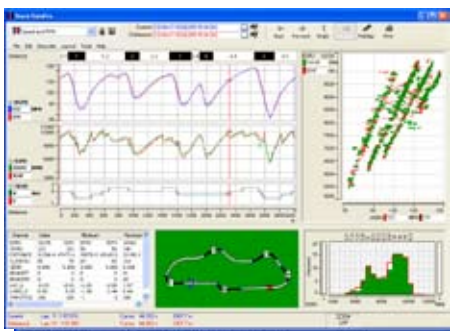
Driver Displays



An attractive optional feature of the Engineering Systems - if your driver requires Real-time feedback of monitored parameters during vehicle operation, we have a range of Driver Display options available, which can be mounted inside the cockpit.

A display can monitor 9 parameters. Configurable displays are available so you can define which parameters to monitor as well as design your own display screens. An Intelligent Alarm system is also featured - this assists the driver with a warning light and message when a monitored paramter is exceeded (the limits of which are user

Data Analysis Software



Stack DataPro is a comprehensive suite of software tools, which you can use to collect, analyse and organise data, as well as set-up and configure the hardware and software to your own specific requirements.

Standard tools, such as X-Y plots, track mapping, histograms, channel values and reports are all included. Many advanced features are also available with Version 3 of DataPro, or in the upgrade to Version 4. DataPro software is a professional solution, yet benefits from an easy-to-use Windows environment and a competitive price to make it available to everyone.

Video Solutions

Adding sight & sound to your logged data is probably the most significant advance in data acquisition for the last decade. The ability to see and hear the vehicle alongside the recorded parameters and values provides a comprehensive and powerful data

The Synchronized Video system enables data to be synchronized against time or distance and with the 'Compare Video' option, undertake side-by-side comparison of different runs or drivers.

We can also provide a palm-sized, Solid-state Digital Video Recorder, which is specifically designed for use in harsh and mobile environments.

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DASH-LOGGERS

Stack is launching a new data acquisition platform, which offers exceptional performance at an entry-level price but without compromising on Stack's reputation for quality.

Announcing most competitively priced Stack Data-loggers ever! Unbeatable combination of value for money, reliability and ease-of-use with powerful yet simple professional data analysis software included as standard.

Preconfigured Dash-Logger Systems

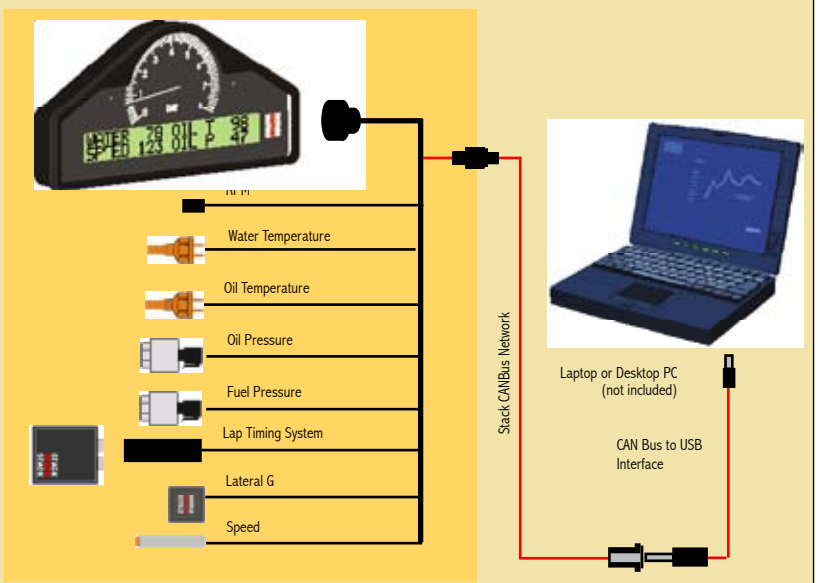
Stack's preconfigured dash-loggering systems are specifically designed for the first time data acquisition system user.

These dash logger systems are supplied with the full version of our DataPro professional analysis software that offers features such as Track Mapping that helps the user to navigate through the data by providing an on-screen reference between the data trace and track position. This software graphs all parameters against track position to make comparative analysis simple.

These systems include all sensors & harnesses and are pre-configured to suit most popular requirements. They are supplied with a full version of DataPro analysis software, allowing the user to analyse the most important engine, driver and vehicle performance parameters.

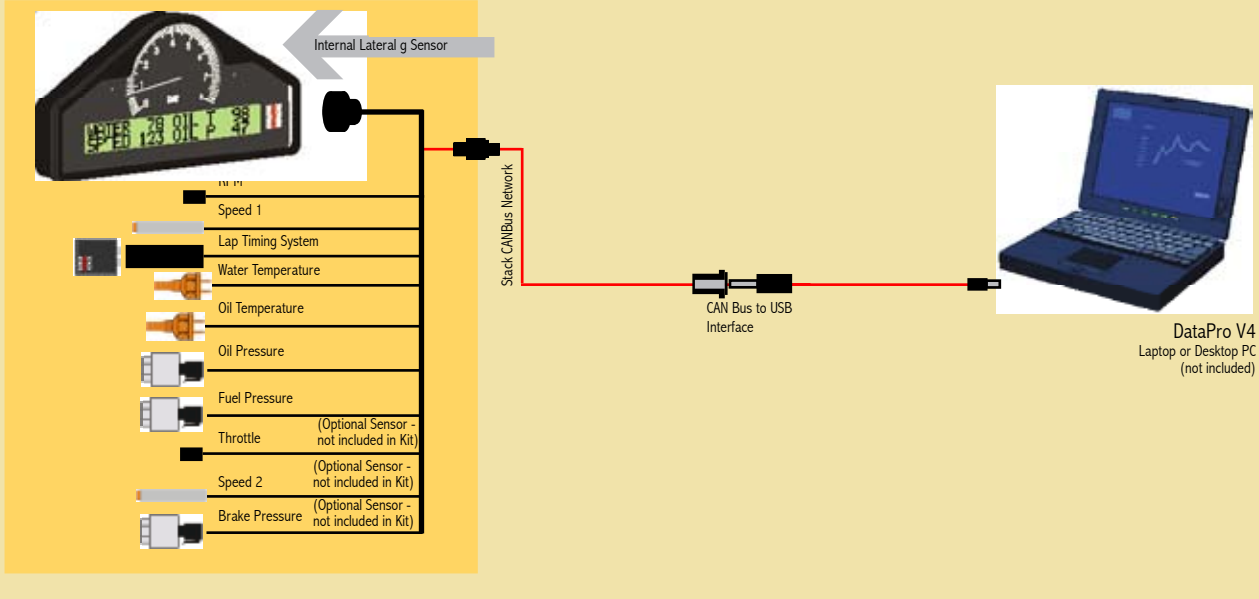
Furthermore, when ready for more data, the user can simply upgrade to our more powerful ST8802 configurable system.

ST8102S/SP[3] System Architecture



[3] "SP" version includes the Predictive Lap Time, Performance Meter and Corner Speed display options as standard.

ST8112 System Architecture



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DASH-LOGGERS

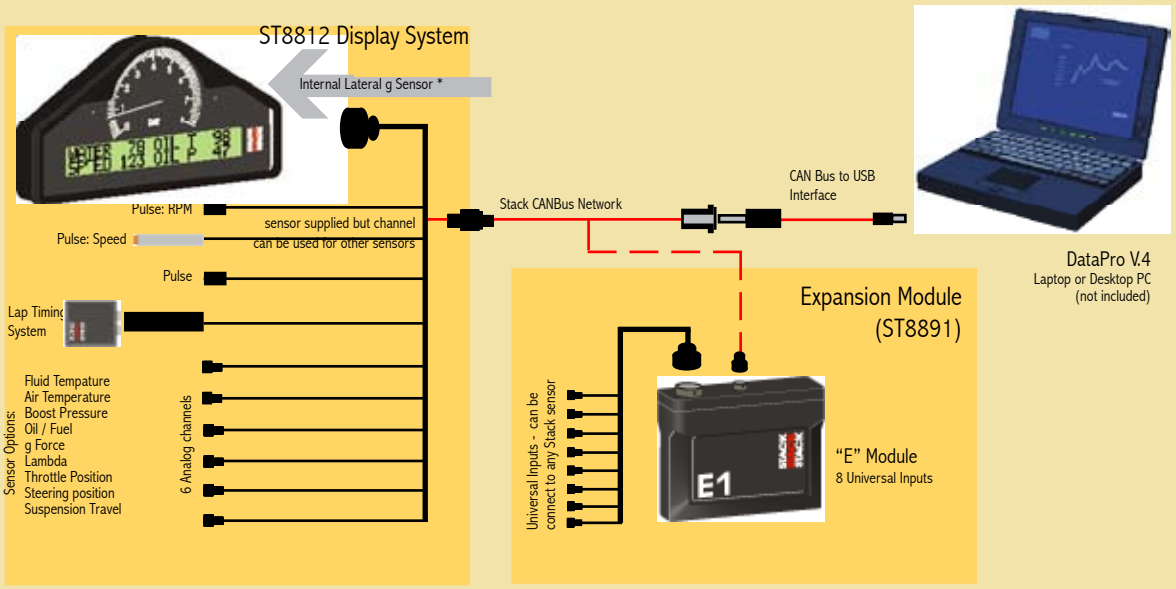
Configurable Dash-Logger Systems

Stack Dash-Loggers integrate dash and data logging capability and offer an unbeatable package for smaller teams and driver-engineers. These systems are designed for drivers and teams without a full-time data engineer who still want instant feedback of time gains and losses as a result of changes made between sessions and between different drivers.

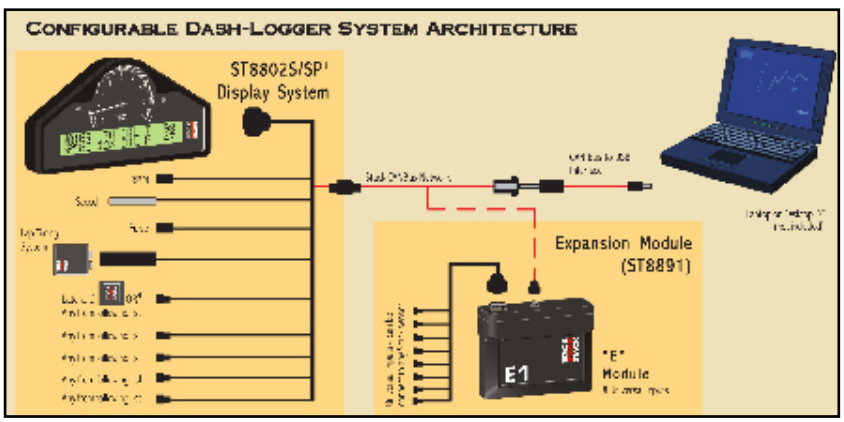
Offering full upgradability, these systems can be expanded to meet the demands of the highest levels of professional racing. Our Configurable Dash Logger module has sufficient inputs to meet most engine and driver analysis requirements and, by adding an additional sensor interface module, can be expanded to meet the demands of chassis analysis.

The ST8802S/SP[1] Dash-Logger can be configured to work with a wide range of sensors, allowing the system to be set up to suit most engine and driver monitoring requirements. On its own the dash will monitor and record up to 12 individual sensor channels plus battery voltage and lap times. The ST8891 includes an Input Expansion module to provide 8 further universal sensor inputs.

Configurable Dash-Logger System Architecture



* Lateral g standard. Longitudinal & Vertical g pin code upgrade.



[1] "SP" version includes Predictive Lap Timing, Performance Meter and Brake Bias display options as standard

[2] ST8891 only

[3] For use on the Dash-Logger pulse input only, OR on any of the Expansion Module (ST8891) inputs

[4] Lateral G Sensor supplied as standard with connection to analog channels. An interface is available to purchase to allow pulse channel connection.

DASH SENSOR OPTIONS

Fluid Temperature Sensors 0 to150 °C
Air Temperature Sensor -15 to 30°C
Boost Pressure Sensors 0 to 3.5 bar
Oil/ Fuel Pressure Sensors 0 to 10 bar

Brake Pressure Sensors
G Force Sensors
Pulse Sensors for wheel speed/RPM
Lambda Sensors

Thermocouple (EGT/ Brake/ Air)[3]
Throttle Position Sensors
Steering Posiiton Sensors
Suspension Travel Sensors[2]

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ENGINEERING SYSTEMS

ST8900 Engineering Systems

The Stack ST8900 Engineering Systems are configurable data-logging systems offering the best combination of professional data acquisition hardware and software, packaged for optimum ease-of-use

The ST8900 Engineering Systems are available to fit to a vehicle either as a 'Stand-alone' system or by connecting to any Stack Steering Wheel or Dash Display system. Our range of Steering Wheel and Dash Display products are covered in our Instruments brochure. Using different combinations of standard hardware modules, and our DataPro Designer configuration software, the data acquisition system can be easily and quickly configured to suit any application, offering unrivalled flexibility. Furthermore, the systems can be easily upgraded by simply adding additional modules.

DataPro Data Analysis Software provides a comprehensive analysis solution, enabling the calculation of derived channels from recorded data as well as comparison of data between other systems regardless of configuration and size. By adding a Stack Video Solution to the system, such as the Synchronized Video-Logger System, this completes a powerful and comprehensive data acquisition system with the ability to view what is occuring at any point in the data recorded.

Key Features include....

- Flexible system comprising compact, durable and lightweight modules
- Systems available to record data from up to 80+ individual sensors
- Individual sensor channels can be recorded at up to 200Hz
- CANBus data network enables systems to record up to 8000 data samples per second
- Systems available with up to 64 Mbytes of solid state memory
- Standard high speed data download via the PC USB port
- Modules are fully sealed to IP68 standard and feature Mil-spec connectors
- Required harnessing supplied as standard
- Comprehensive range of standard sensors and interfaces
- Systems also available to interface with most Motorsport ECU's

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ENGINEERING SYSTEMS

ST8900 Engineering Systems - Overview

ST8900 Engineering Systems are supplied as a 'Stand-alone' data logging system, or as a data logging expansion system for any of Stack's fixed-configuraton or configurable Steering Wheel and Dash-Displays. All ST8900 Engineering Systems are fully configurable and can be supplied with 8 to 256 channels, providing maximum flexibility for all applications. Systems are built up from a combination of Sensor Interface Modules, each providing different functionality, together with a Recorder ('R') Module; in smaller configurations the Recorder is integrated with a Sensor Interface Module. Modules are networked on a 4-wire CANBus and the modular construction enables the Sensor Interface Modules to be placed separately and in different parts of the vehicle close to the components to be monitored. As a direct result of this flexible design the sensor harness lengths are minimised and simplified.

Engineering Systems are supplied as complete packages, including modules, DataPro configuration and analysis software, all harnesses, and download cable. Where a standard package does not suit the application, customized solutions can be provided, including ECU interfaces, CAN interfaces, and further Input Expansion Modules, increasing the number of channels up to a total of 256.

'Stand-alone' Engineering Systems

There are 9 'Stand-alone' Engineering systems to choose from, ranging from 8 channels up to 128 channels. 'Stand-alone' systems start with a Display and Sensor Interface ('DS' or 'DSR') Module with 8 sensor inputs plus lap time and recording control switch inputs. Extra inputs are provided by up to 5 Input Expansion ('E) Modules. 'Stand-alone' systems can be fitted with an optional LCD driver display and 1 or 2 analog dials.

Engineering Expansion Systems

Engineering Expansion Systems connect to a Stack Dash-Display or Steering Wheel System on the CANBus network. Up to 40 additional sensor inputs can be recorded using Input Expansion Modules ('E' Modules). Each 'E' Module has 8 universal sensor inputs. The Recorder ('R')

'DS' modules - Sensor Interface & Display Modules

All 'Stand-alone' Engineering Systems include a 'DS' (or a 'DSR') Module. This module has an engine RPM input, 2 pulse inputs for wheel speeds or our low frequency DSP sensors such as boost pressure, and 5 universal inputs (0-5Volts, 330 Ohms, 3K3 Ohms). It also has a lap timer input and 3 switch inputs/outputs for recording control/status and driver alarms. The 'DS' Module also has outputs to drive an optional configurable LCD driver display and up to 2 analog dials for RPM and Boost, together with a further 8 switch inputs/outputs for display

'E' Modules - Input Expansion Modules

Each 'E' Module has 8 universal sensor inputs. Each input can be configured individually to accept any standard sensor or sensor interface from the Stack range, or to directly measure 0-5 volts, 0-333 Ohms inputs, or a pulse frequency up to 40kHz. Each input can be sampled at up to 200Hz. When used with Stack's range of 'digital' sensors or sensor interfaces, any sensor input can be configured to enable a fast-changing parameter to be recorded slowly, by measuring the average parameter value throughout the sampling period. For example, suspension movement, with a maximum frequency response of 100Hz, can be recorded at 10Hz for pitch and roll measurement, thus extending the recording time and reducing the memory usage.

'R' modules - Data Recording Modules

Depending on the configuration, the Recorder Module can record from 20 up to 128 channels of data through the Stack CANBus data network, as well as from a vehicle's host CANBus network via a Stack Gateway Module (below). These channels can originate either from the Stack Dash-Display or Steering Wheel System or from any Sensor Interface Module connected into the system. The Recorder can be configured to record each channel individually from a sampling frequency of 1Hz up to 200Hz, and up to a total of 8000 samples/sec (depending on the configuration of the 'R' Module). The standard Recorder Module memory capacity is 8 Mbytes (this can be expanded). Data is transferred from the Recorder Module to a PC via the Stack CANBus network, using the PC

'G' modules - CANBus Gateway Modules

The CANBus Gateway module acts as a bridge between a host vehicle CANBus network and the Stack data acquisition system. Up to 256 channels can be taken off the host CANBus and transferred to the Stack CANBus where they can then be recorded, displayed, used for alarms and warnings, etc. To correctly interpret parameters from a host CANBus, DataPro Designer software can import a proprietory Protocol from a 'Vector.DBC' file. Multiple CANBus gateway modules can be included in a data logging system so that data can be recorded from different host CANBus networks, or if the host network exceeds the message processing limit of a single Gateway module.

'ER' & 'DSR' modules - Sensor Interface & Recorder Modules

The 'ER' Module integrates full 'E' Module functionality with data logging capability, providing 0.5 Mbytes of solid state memory with 20 recordable channels at up to 50Hz. The 'DSR' Module provides the same integrated functionality, but based on the 'DS' Module.

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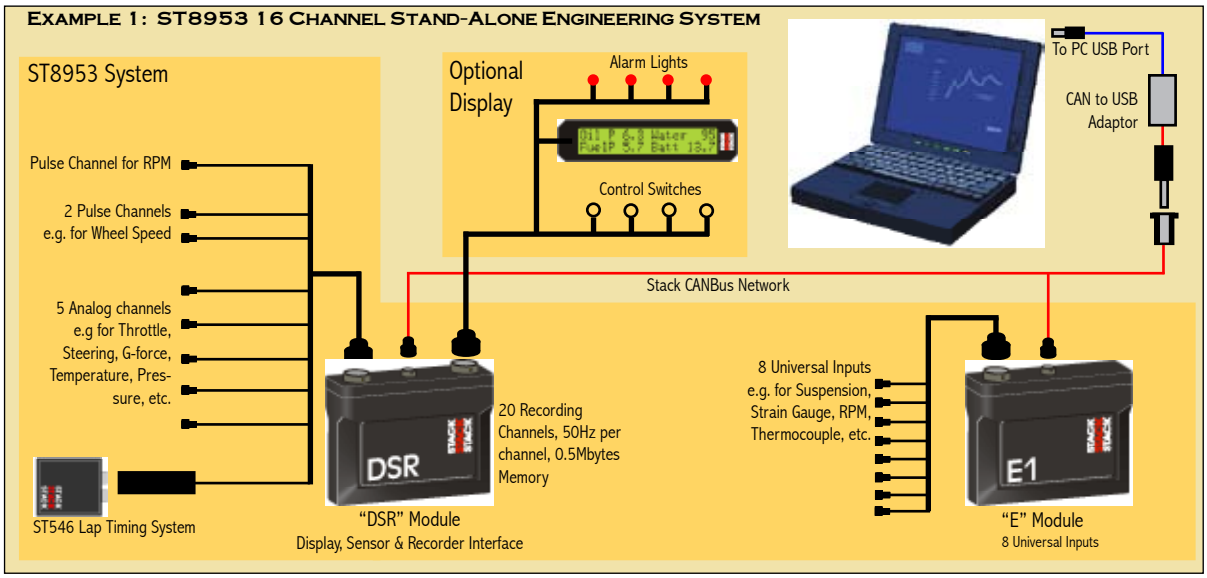
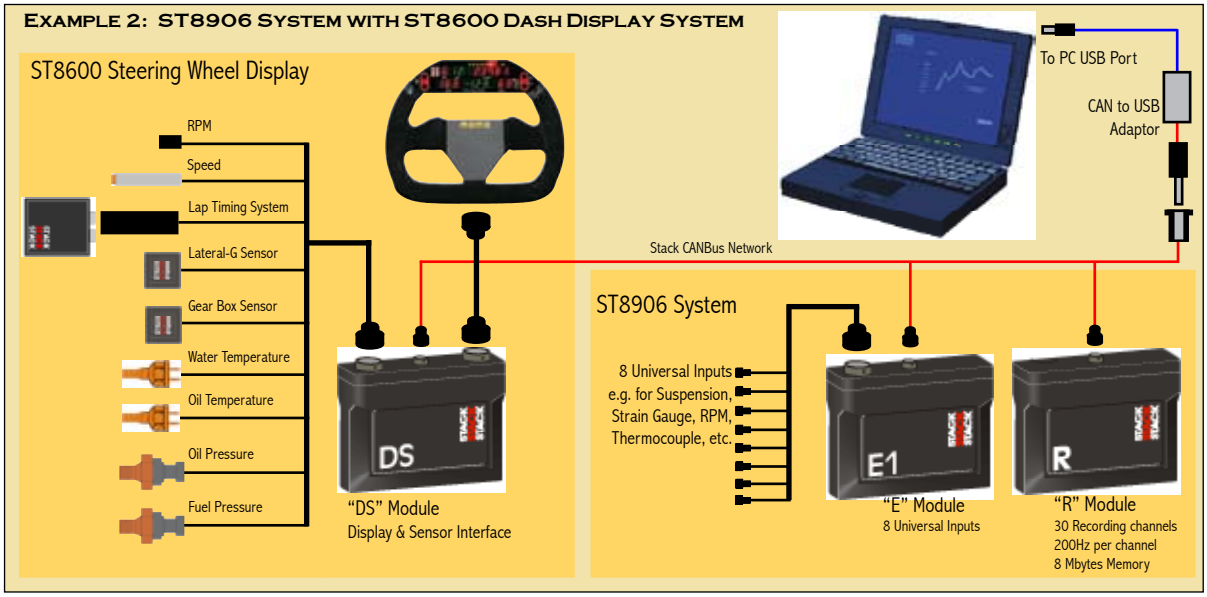
ENGINEERING SYSTEMS

ST8900 Engineering System
Schematic Diagrams of Packaged Systems

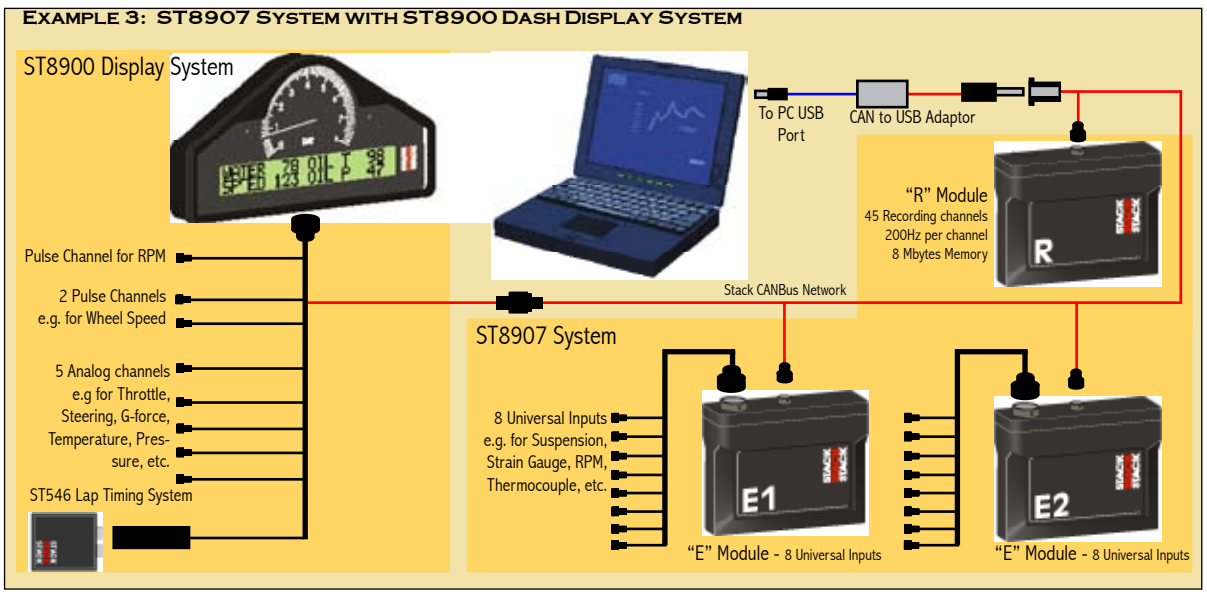
Example 1: ST8953 16 Channel Stand-Alone Engineering System



Example 2: ST8906 System with ST8600 Dash Display System



Example 3: ST8907 System with ST8900 Dash Display System



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DRIVER DISPLAY OPTIONS

Optional Driver Display Systems

Stack have a full range of tachometers, gauges and dash displays, the full range of which is featured in our Instruments brochure. For Real-time driver or operator feedback, Stack Data Acquisition Systems are designed to be connected to any Stack Dash Display Module*. Fundamentally, our Dash Display systems can be categorised into 2 different categories; Preconfigured and Configurable. Preconfigured Dash Displays are designed to replace the main instruments within a vehicle's dashboard and combine them into one, easy-to-read display. Paramters which are monitored include engine speed (RPM), oil-pressure, fuel-pressure, oil-temperature, water temperature, and voltmeter.

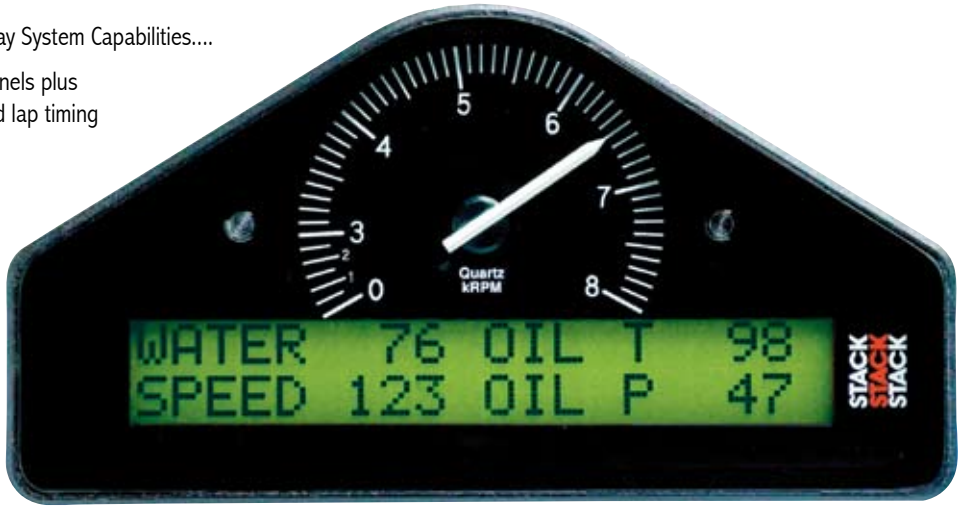
*Not including the ST700 displays.

Our Configurable Dash Displays are for users with a non-standard display requirement and wish to select from a larger variety of sensors to monitor alternative vehicle parameters. Examples of both display systems are covered over the next 2 pages.

Configurable Driver Display Systems

Summary of Configurable Dash Display System Capabilities....

- Seven configurable sensor channels plus engine RPM, battery voltage and lap timing
- Six user defined display pages with up to six values displayable on each page
- Fully configurable alarms alert driver by display messages and/or warning LEDs
- Fully upgradable to 64+ channel Engineering Systems (ST8900)

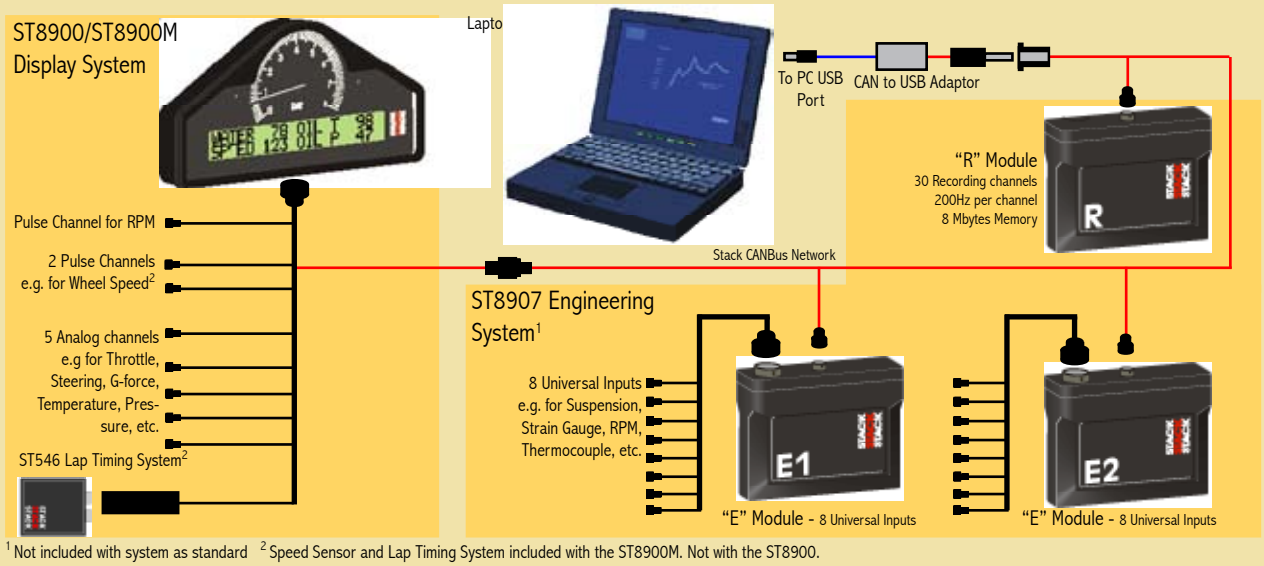


Stack Configurable Display Systems are designed for users with a non-standard display requirement. The system monitors up to 9 parameters, 7 of which are user configurable and can work with a wide combination of sensors, allowing the system to be set-up to suit most engine and driver monitoring requirements. Systems are supplied complete with harness and DataPro Configuration Software.

ST8900 Configurable Dash Display System

Designed specifically for use with Stack's Engineering Systems range of Data-Loggers. The unit displays and is supplied with 8 inputs as standard. Additionally, the ST8900 systems can also display information from any of the inputs on the Engineering System, up to a maximum of

Configurable ST8900/ST8900M Dash Display System Architec-



[1] Not included with system as standard [2] Speed Sensor and Lap Timing System included with the ST8900M. Not with the ST8900.

DRIVER DISPLAY OPTIONS

ST8850 SLIMLINE CONFIGURABLE DISPLAY SYSTEM

The ST8850 Liquid Crystal Display has been designed to present driver information in as clear and precise way possible. Backlit Transflective display technology guarantees a highly visible display in all environments from complete darkness to bright sunlight.

The large, 8mm high character, 2x20 display is used for displaying required values. During alarm conditions the whole display presents the warning message and associated alarm value. Simple operation controls enable scrolling through 6 display pages, with each layer having either 2, 4, or 6 values.

A Telemetry enabled version, the ST8950T, is also available, for use with our Engineering Systems.

PRECONFIGURED DRIVER DISPLAY SYSTEMS

ST8600 STEERING WHEEL DISPLAY

Stack, in conjunction with Farringdon, have produced a range of steering wheel display systems. This product uses the latest digital technology and is specifically designed for vehicles - such as Formula cars - where a conventional dash system cannot be easily fitted. The system is availbale in standard specification and as an "M" version that adds a speed sensor, infrared lap timing system, performance meter and predictive lap timing system to the standard package.

9 STAGE SEQUENTIAL SHIFT LIGHT/ TACHOMETER

The 9 sequentially illuminated ultra-bright shift lights provide a precise indication of engine RPM, and rate of change of RPM, enabling the driver to perfectly anticipate gear shift points. Each shift light can be individually programmed for a specific RPM value.

DIFFERENT COLOURED LED READOUTS ENHANCE READING "AT A GLANCE"

Separate red and green LED readouts enable the driver to instantly identify specific information of in-

Standard Features include:

- Display integrated into steering wheel (supplied)
- Gear No. indicator integrated into display
- Alarms on all engine parameters
- Peak Value Recall on all parameters
- High intensity LEDs ensure easy readability
- Shift lights can be individually programmed
- Supplied with control module, all sensors, and harnesses
- Mil-spec. connectors
- Fully compatible with Stack Data Acquisition systems

270 MM/ 340 MM STEERING WHEEL OPTIONS

270 mm wheel

340 mm wheel

Model	Speed (ST670)	RPM	Oil Pres.	Fuel Pres.	Water Temp.	Oil Temp.	Battery	Gear No.	Lap Time	Lap No.	Lap Timing (ST546)	Performance Meter	Predict. Lap Readout
ST8600	Option	✓	✓	✓	✓	✓	✓	☑[1]	☑[3]	☑[3]	Option	Option	
ST8600M	✓	✓	✓	✓	✓	✓	✓	☑[2]	✓	✓	✓	✓	✓

☑[1] Requires appropriate gear position sensor, ☑[2] Requires appropriate gear position sensor, or RPM & Speed to be monitored ☑[3] Requires Manual (ST5097) or Infrared (ST546) lap timing kit

WiFi Wireless Data-logger

Enjoy the power and convenience of wireless data download! Stack's WiFi Wireless Data-logger system enables users to download recorded data remotely each time the cars enter the pitlane - and is in range.

Fast, secure and convenient!

Summary of the main features...

- Wireless WiFi connection between data-logger and PC
- Automatic download when car arrives in pit - to PC up to 50m away
- Optional alarms flag problems automatically as data downloads
- Simple and fast configuration and installation
- Use with Stack's powerful and easy-to-use DataPro software
- Data encryption provides total security

WiFi Wireless Data-logger add-on and upgrade options for existing systems:

Simple, fast installation and configuration - easy to upgrade existing systems

Option 1

Option 2

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DASH-LOGGERS

Dash-Logger Systems

The Stack range of Modular Data Acquisition Hardware can provide a total data solution, tailored for your specific vehicle requirements, from 4-channels or to as many as 256-channels, complete with specialist technologies including Synchronized Video and Solid-State recording.

Our most popular data acquisition products are the Stack Dash-Logger systems, which offer the ideal combination of professional hardware and software.

These systems are designed for drivers and teams without a full-time data engineer who still want instant feedback of time gains and losses as a result of changes made between sessions and between different drivers. Offering full upgradability, these systems can be expanded to meet the demands of the highest levels of professional racing.

Our Configurable Dash-Logger module has sufficient inputs to meet most engine and driver analysis requirements and, by adding an additional sensor interface module, can be expanded to meet the demands of chassis analysis.

The Configurable Dash-Logger systems are supplied complete with harnesses, Version 3 of our DataPro analysis and configuration software, infra-red lap timing system, wheel speed and lateral g sensors. The only additional requirements are the specific sensors necessary for the

Summary of Configurable Dash-Logger System capabilities...

- 8 configurable sensor channels plus battery voltage and lap timing; expandable to 16+ channels
- Records and Displays any combination of engine, driver and chassis sensors
- Fully configurable LCD display pages; Six user defined display pages with up to six values displayable on each page
- Fully configurable alarms alert driver by display messages and/or warning LEDs
- Individual recording frequency for each channel
- Predictive Lap Time, Performance Meter and Brake Bias display options
- Fully upgradable to 64+ channel Engineering systems

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DASH-LOGGERS

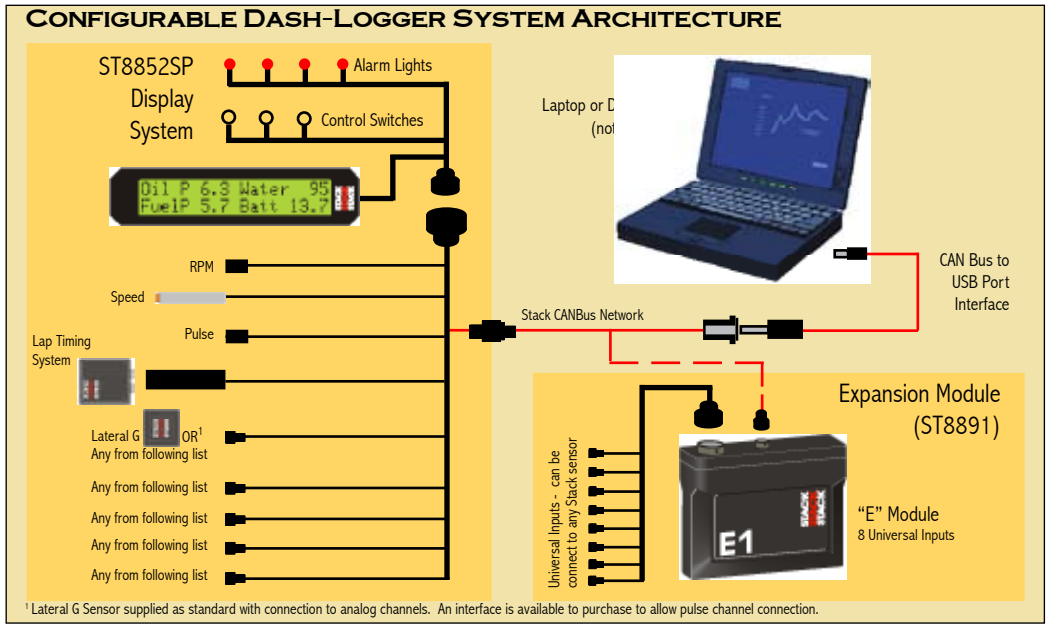
SLIMLINE CONFIGURABLE DASH-LOGGER SYSTEM

The SlimLine Dash-Loggers feature a small, light transflective display that suits any vehicle where dashboard space or packaging is at a premium. The display can be configured to display any channel that is connected to the Logger, with up to six pages and up to six channels displayed on each page.

The Display is also capable of providing Brake Bias and Performance Meter information (additional sensors may be required). The input capability of this module can be further enhanced with an additional 'G' Module (Gateway Module) to provide further expansion. This is a proven display system in the classes where the original dash must remain in the car.

There are two SlimLine Dash-Logger Systems to choose from, both of which provide 9 channel inputs on the dash. The ST8851S will monitor and record up to 4 individual sensor channels, plus battery voltage and lap times. By including the ST8891 Expansion Module, the ST8852SP will monitor and record up to 20 individual sensor channels, plus battery voltage and lap times.

CONFIGURABLE DASH-LOGGER SYSTEM ARCHITECTURE



[1] Lateral G Sensor supplied as standard with connection to analog channels. An interface is available to purchase to allow pulse channel connection.

Standard Sensor Options

Stack provide a wide range of sensors and specialist interfaces to meet the vast majority of motorsport requirements. We only offer sensors that have passed our rigorous testing program, and have proven suitable for motorsport applications.

The following describes the characteristics of our main sensor types. Please refer to our Sensor Specification and Price List for the full range

Digital Sensors and Amplifiers

We manufacture our own range of high precision digital sensors and amplifiers incorporating Digital Signal Processing (DSP) within the sensor.

Used in conjunction with the ST8900 systems these sensors offer unrivalled performance, with up to 15 bit resolution (0.003%) and <0.5% total error over the whole operating range of the sensor.

Furthermore, these devices also enable high frequency signals - e.g. 1-2 kHz - to be recorded at any sampling frequency down to 1 Hz without risk of aliasing errors, and can greatly increase

Our range of digital sensors and sensor amplifiers include:-

- 5mV to 20V differential input amplifiers
- K-Type Thermocouple Interface
- Absolute Pressure Sensors
- 2"/50mm to 8"/200mm Linear Displacement Transducers
- 10"/250mm to 20"/500mm 'String Pot' Transducers

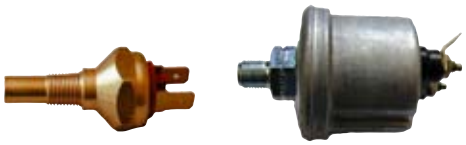
Solid State 0-5 Volt Output Sensors

These sensors typically offer 1% accuracy - over their whole operating range - and are ideal for monitoring chassis and engine parameters where Digital Signal Processing is not required.

The range of sensors includes:-

- 0-3.5Bar/50PSI, 0-10Bar/150PSI Pressure Sensors
- 0-100Bar/1500PSI Pressure Sensors
- -30°C to 150°C Temperature Sensors
- 50mm to 200mm Linear Displacement Sensors
- 10"/250mm to 20"/500mm String Potentiometers
- +/- 5g Accelerometer

Automotive Sensors



We also supply a range of automotive spec. pressure, temperature and rotary displacement sensors suitable for measuring basic engine condition and driver inputs. This range includes:-

- 0-2Bar/30PSI, 0-10Bar/150PSI Pressure Sensors
- -20°C to 30°C, 0°C to +150°C Temperature Sensors
- 120°, 360° Rotary Throttle & Steering Position Sensors

Environmental Specifications

Operating Voltage: Reverse Voltage Protection:	8.0 to16.0 Volts +/- 30 Volts
Sealing: Operating Temperature Storage Temperature:	Water ingress protection to IP68 -20°C to +70°C / -5°F to +145°F -40°C to +80°C / -40°F to +175°F
Humidity Vibration	Operating & Storage 0-100% 12 Hr x 3 axis Sinusoidal Test, 20g 50Hz-2kHz
Fluid Exposure	Fuel, Oil, Brake fluid, etc.
EMC Radiated Emissions EMC Radiated Immunity EMC Conducted Immunity	EN55024B CISPR25 50 V/m to DIN40839 Cat IV
Memory Life	Guaranteed memory retention time >5 Years

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DATAPRO SOFTWARE

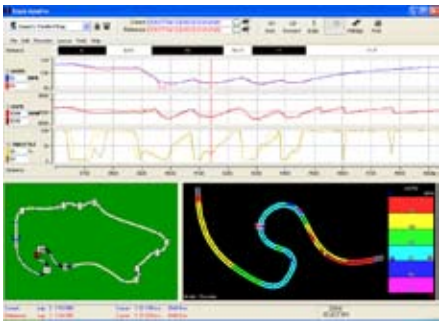
Stack Software Products Overview

Whatever your data acquisition requirements, our comprehensive suite of software tools provide a full turn-key solution to facilitate the collection, analysis and organisation of data. Professional features, such as an Advanced Maths Package, Telemetry Solutions, and GPS support, are available, but you don't have to be a Professional to use these. We believe that Stack DataPro is the easiest to use professional data acquisition software available at any price. Listed below are the software solutions available from Stack...

Stack DataPro Data Analysis Software V4

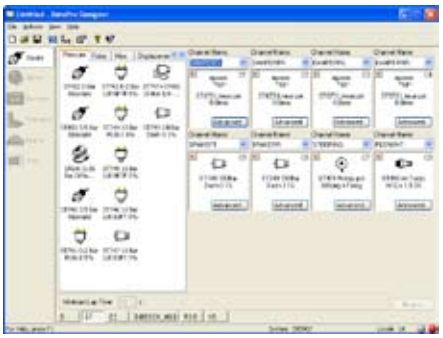
Upgrade to the latest version of DataPro, which benefits from an enhanced feature set, including Telemetry & GPS Support, a new map creation wizard, hot buttons for easier trackside use, and an enhanced run viewer. Powerful new modules can also be added as required to further enhance the performance of Version4. These include...

Rainbow Maps: Display any channel as a colour scale, that can be zoomed in on for enhanced clarity or when things are happening on the track and where.



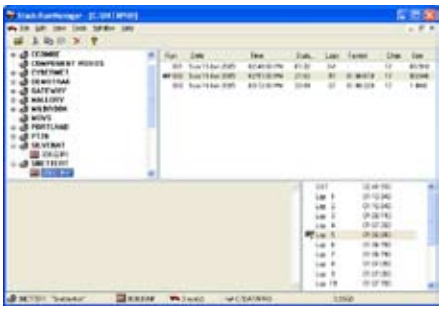
Advanced Maths Package: Post download calculation can now be accomplished using our new Advanced Maths Package, which enables the user to further examine the data they have recorded. Over 100 functions cover virtually all possible needs of the professional motorsport teams and users.

Stack Designer Software



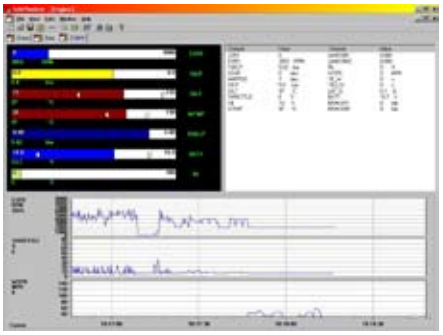
DataPro Designer Software facilitates easy "Drag-and-drop" configuration of all elements of the data acquisition system. Simply select your Driver Display System and Engineering System from the drop down lists provided, and set-up each module to meet your project's specific requirements.

Stack DataPro Run Manager Software



Stack DataPro Run Manager provides an efficient and easy-to-use solution to data and file organisation. Using a familiar 'Explorer' style interface for managing data files, the software offers Data Archiving and Backup functionality as well as the ability to copy and move files.

Stack GSM/Radio Telemetry Software



Stack TeleMonitor Software is a universal system, which supports GSM cell modems or a direct radio link. TeleMonitor features an easy-to-use and simple "Drag-and-drop" configuration, and caters for any number of channels from 1 to 256 channels, with variable update rates.

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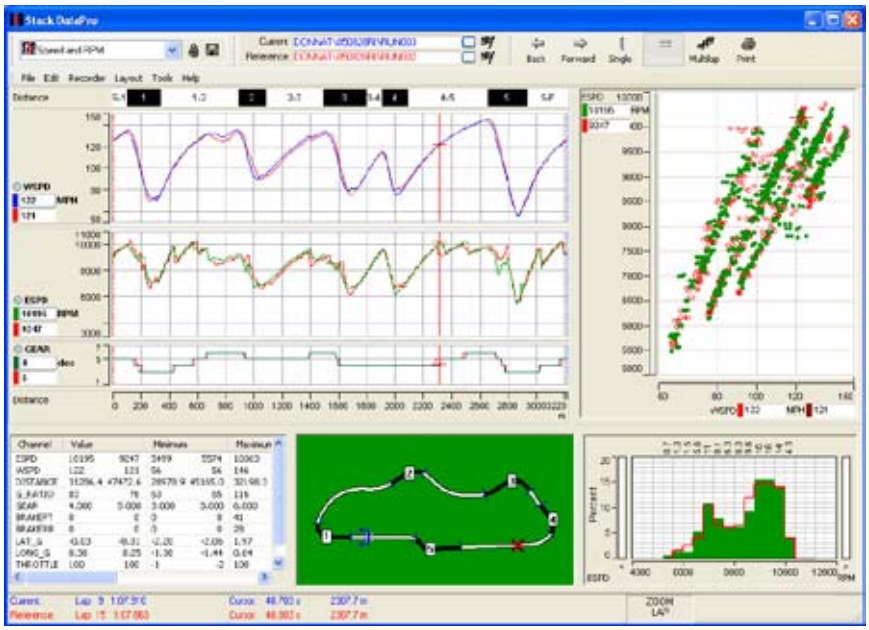
DATAPRO SOFTWARE

DataPro V4 Data Analysis Software



Summary of the main features...

- Pre-configured layouts to help novice users
- Fully customisable and user configurable Layouts
- Simple system configuration provided by DataPro Designer
- Layout Manager allows Layouts to be grouped together for different tasks and users
- Docking Panes feature means that a data analysis pane is never hidden
- Lap Normalisation ensures all laps overlay accurately for data comparison
- Toggle between Distance and Time base Charting
- Overlay Chart data from different, or same, run
- Show data value at cursor position on the Chart
- Timeline and Corner Radius Charts
- Rolling Lap Time Chart and Report
- Histogram panes with compare facility
- Segmented Lap, Run and Statistics Reports
- Infinite zoom-in into any section of data
- Track Map shows the actual track position relating to the cursor position on the Charts
- Overlay different types of parameter on the same chart - e.g. Steering and Lateral G
- When zoomed-in to section of a lap the area under analysis is highlighted on the Track Map
- Zoom level can be set through Chart or Track Map
- Simultaneous update of all panes when zoom level or highlighted area of chart or map is changed
- Beacon Alignment allows runs with different beacon locations to be accurately aligned
- Run Marker editor allows missing lap times to be entered into the data
- Run Notes record set up information for the run
- Calculation of Track Maps from recorded vehicle data
- Maths package to derive additional parameters from recorded data
- Multiple Vehicle support automatically downloads data into individual vehicle specific data directories
- Print using any Windows compatible printer Allows data to be shared between users
- Run Manager for data archiving, backup, moving and copying of files between directories and PC

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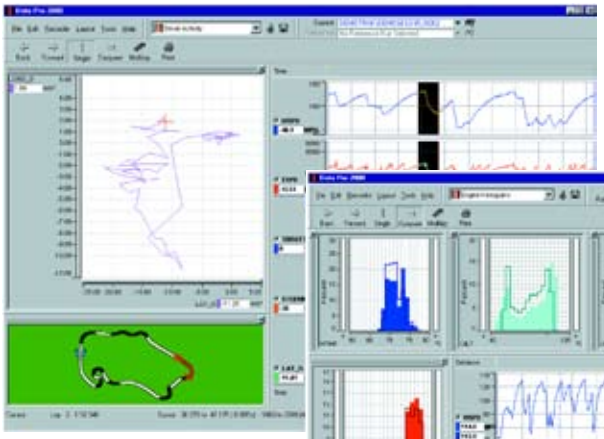
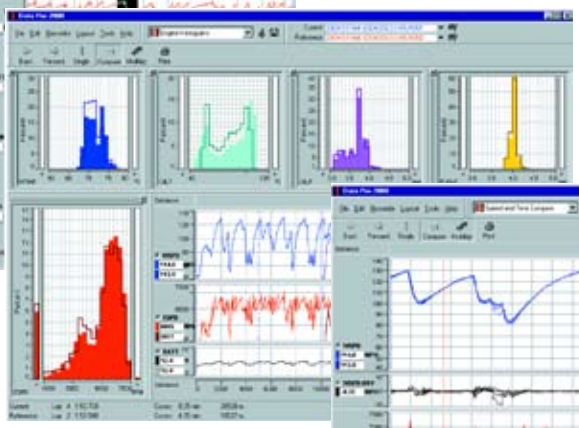
DATAPRO SOFTWARE

DataPro Data Analysis Software

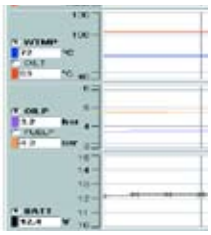
DataPro Analysis Software Capabilities Include...



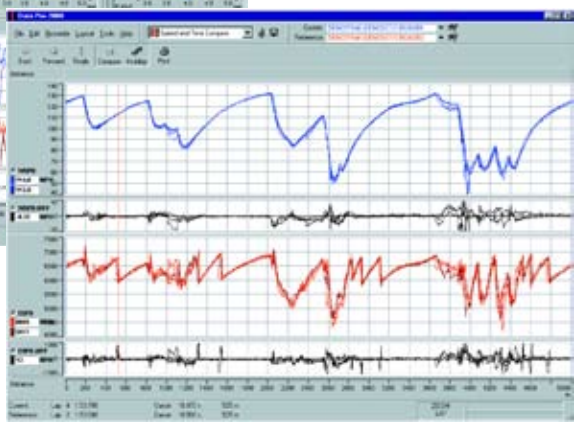
X-Y plots and histograms update dynamically in real-time as the user selects a portion of the data on either the strip graph or map



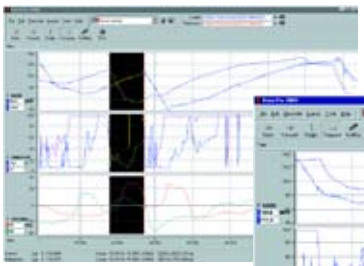
When comparing data, all panes including X-Y graphs and histograms display both sets of data

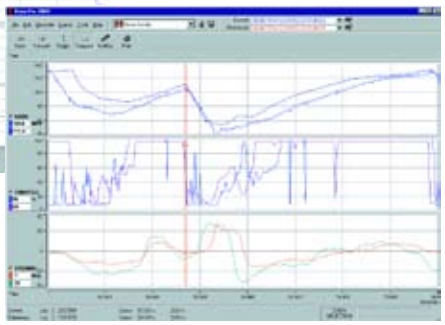


Charts automatically show individual data points when zoomed in to small areas of detail



Data sets can be compared against time or distance, differences can be displayed both graphically and numerically





Data can be aligned manually, or automatically, by the insertion of marker points

Powerful data export feature provides the user with complete control of data to be exported

Unique Window Docking System...

This feature controls the size and position of the individual information windows (or panes). Although the user can add new windows to a layout and re-size and re-position windows anywhere within the layout, the docking system ensures that all windows remain fully viewable and that the screen area is fully

Multi-Car Software...

Multi-Car Software has been specifically developed to meet the requirements of one make series, sanctioning bodies, and for teams running a large number of cars. This optional application automatically downloads data from individual cars into their own unique data directory, thus ensuring that data is never misplaced or confused. Multi-Car software fully integrates into DataPro and the full suite of analysis tools are available to the user.

Hi-speed CANBus to USB Download...

All Stack Data Acquisition Systems utilise a CANBus network for transmitting data at high speed. DataPro downloads data directly off this network, communicating with the PC through a USB cable and connection. This ensures very fast data retrieval speeds, typically 100 times faster than that of a serial download.

STACK STACK STACK

DATAPRO SOFTWARE

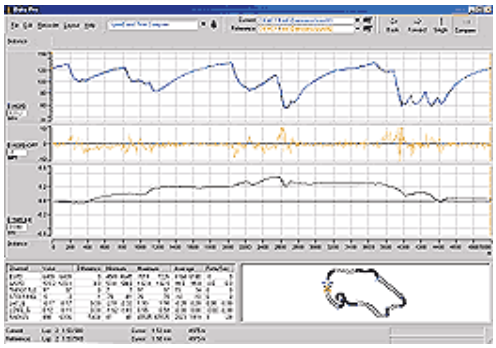
DataPro Charts & Histograms

Stack DataPro Charts...

Charts are the main tools used for detailed analysis of vehicle and driver performance. For parameters such as speed, throttle and time, small variations between runs can be identified and the reasons for a performance difference accurately established.

Timeline Analysis...

The Timeline Analysis function clearly shows where and how much time is gained (or lost) between two laps. Gradient of timeline shows the relative time change over the lap distance. A downward gradient shows the current lap is faster, an upward lap gradient that the reference lap is faster, and where the gradient is flat the two laps are



Rolling lap Times...

The Rolling Lap Time provides a virtual rolling lap time for a whole run. This allows the user to establish the actual fastest lap pace, optimum number of laps for a set of tyres, obtain meaningful time data from an in-lap and measure driver consistency.

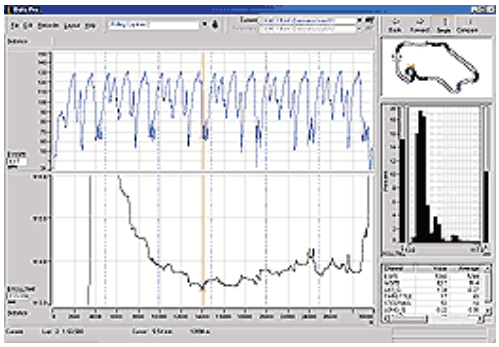


Chart Features...

- Lap overlay comparisons between any run and session
- Alignment of laps with different beacon position
- Infinite zoom-in into any virtual track segment
- Multiple lap overlays
- Edit chart colours, line type and line width
- Create difference charts for any parameter
- Real-time switch between distance and time axis

Stack DataPro Histograms...

Histograms show an overall picture of vehicle, or driver, performance and are useful for identifying small differences between sets of widely fluctuating data such as engine RPM or damper velocity.

These also provide an ideal format for displaying engine temperature and pressure data. At a glance the user can identify if the engine is running normally, or if there is a problem developing.

Lap Zoom...

By highlighting a lap, or laps, the user can establish if the vehicle is geared correctly for the track and conditions.

Run Zoom...

Can be used to check that the engine is running normally within desired temperature and pressure limits.

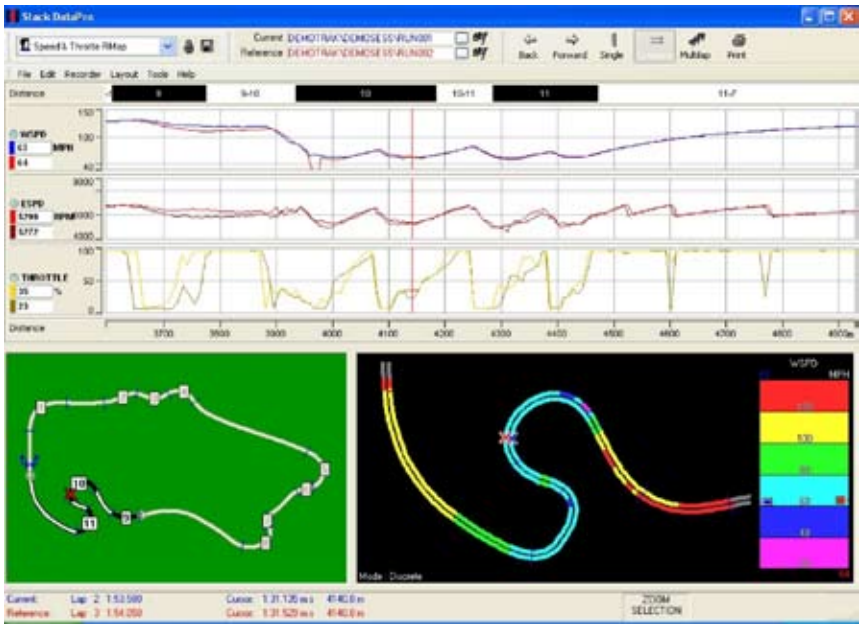
Histogram Features...

- Provide a time at level report for any parameter
- Compare any two virtual segments, laps or runs
- Simultaneous update with change of zoom
- Selectable number of bins, range and scale

STACK STACK STACK

DATAPRO SOFTWARE

Track mapping & Reporting Solutions



GPS data can be used to generate Track Maps and Rainbow Maps.

Furthermore, DataPro can generate Open-Ended Maps for non-circuit based applications including sprints and rallying.

Track Mapping & Reports...

The Stack track map algorithm produces the highest accuracy circuit maps plotted against either time or distance. Track maps are used primarily as a navigation tool and allow the user to easily reference data to track position. The track map can be easily segmented to allow detailed comparison reports to be created. All reports are updated if a segment is modified and the user can call up any stored run from any session, or choose to compare any two stored runs.

Segmented Run Report...

Summarises segment (sector) times for a complete run and highlights fastest segments and calculates the fastest rolling lap, and fastest theoretical lap times. The segmented run is commonly used to analyse driver consistency and establish the fastest actual lap pace.

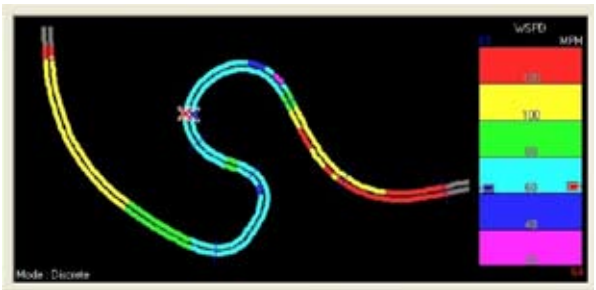
Segment Comparison Report...

Used to compare any two laps and provides summarised time and speed data through each segment (sector) of the circuit. Typically this report is used to show a driver where time has been gained or lost against a team mate, or against a previous set up.

Rainbow Maps...

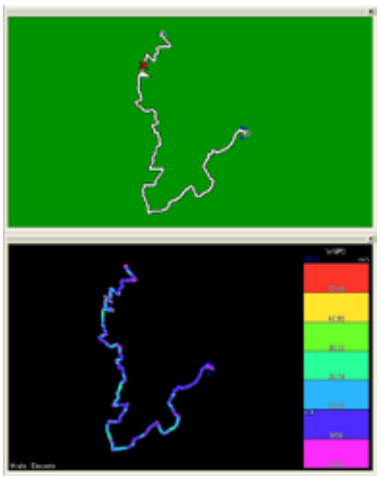
Our 'Rainbow Maps' package provides for a vastly more flexible and informative tool than is currently available in other analysis packages. Specifically, the ability to interactively zoom into any section of the map along with the capability to switch between 'discreet' and 'non-discreet' modes provides powerful functionality for indepth analysis.

* Requires DataPro V4 U



GPS & Calculated Maps...

A GPS software interface is included, so that data from a 1Hz or 5Hz GPS unit can be combined with existing vehicle data channels to create an accurate and reliable performance logging system. Global position (Latitude & Longitude) along with speed, heading, altitude, and time, are available. Full interactive track maps can be created from the GPS data.



Open-Ended Maps...

DataPro Version4 is also capable of producing Open-Ended Maps making it ideal for any non-circuit based racing series, such as sprints, hillclimb or rallying. Open-Ended maps can be generated either from a vehicle's performance data (by combining wheel speed with Lateral and Longitudinal G measurements), or from GPS information, if a GPS system is present.

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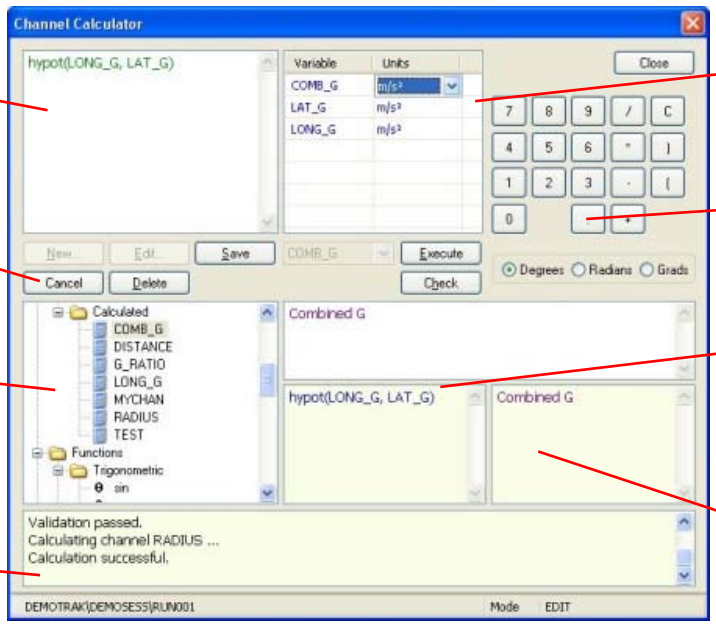
DATAPRO SOFTWARE

Advanced Maths Package*



* Cost Upgrade

Data Calculation Function (Maths Channels)...

The DataPro Calculation Function is a powerful and comprehensive means to derive new analysis data from one or more recorded channels.

Batch Calculation...

Each calculation produces a single channel of new data. Where multiple channels need to be created then a number of individual calculations can be gathered into a single Batch calculation.

Auto Calculation...

Each calculation can be manually applied to the required data or where the calculation is consistently require then DataPro can be configured to automatically apply a single calculation or a batch calculation immediately the data has been downloaded.

Dependant Calculation...

Calculations that require the results from other calculations will cause all donor calculations to execute in the required order.

Key Features include....

- Plain text equations
- Large range of Operators & Functions
- Context based Constraints
- Conditional Calculations
- Calculation Wizard for easy calculation creation
- Immediate Calculation Verification tool

Example calculations....

- Combined G: COMBINED-G= hypot(LONG_G, LAT_G)
- Corner Radius: RADIUS = (WHEELSPEED^2) / LAT_G
- Longitudinal acceleration: LONG-G= smooth(derive(WSPD), 1000)

Conditional calculations....

Example:- Wheel speed calculation to eliminate dropout from a single inside front wheel lockup event. WHEEL_SPEED_CAL = IF(abs(WSPD1 - WSPD2) > 5, max(WSPD1, WSPD2), (WSPD1 + WSPD2) / 2)

Available operators....

^square	/ divide	* multiply	> greater than	= equal	( ) parentheses
+add	- subtract	% modulus	< less then	\ integer divide	! factorial

Available functions....

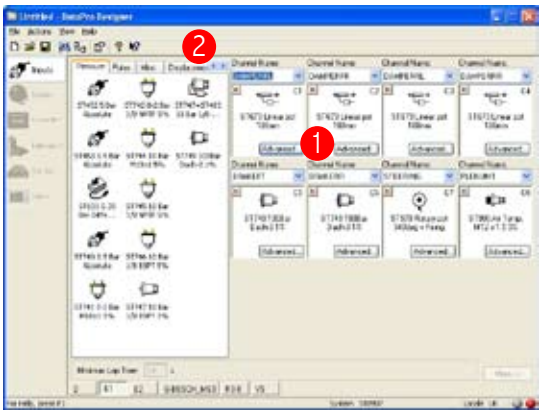
log, ln	max	sinh	cosh	sqrt,	md	acos	ceil	xor	tan	sum	int	and
log10	min	tanh	atan	sqr	abs	asin	not	sin	cos	average	exp	or

DataPro Designer Configuration Software

DataPro Designer software makes configuration of the data acquisition system simple. Select your system from the drop down lists provided, and set up each module to meet your specific requirements

Expansion Module Input Configuration...

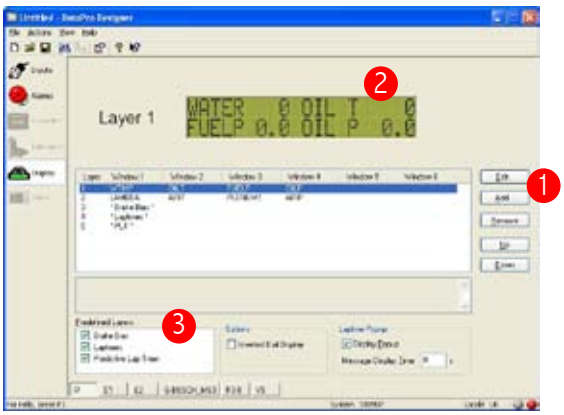
The input configuration tab enables the user to set-up the individual sensor inputs. For each input:-



1. Choose a channel name, either from the extensive drop-down list supplied, or create a name of the user's choice.
2. Choose a sensor from the library (grouped by sensor type) and drag-and-drop it onto the required channel. If the channel name is from the drop-down list, the software will check that the sensor is suitable for the application. The correct calibration values are automatically assigned for the sensor.

Display Configuration...

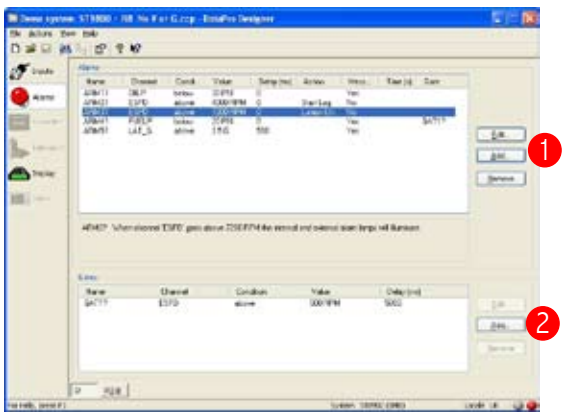
The Display Configuration tab allows the user to create their own display read out layers including customizing parameter names:-



1. Use the Add button to create a new display layer or the Edit button to change an existing layer. The Up and Down buttons allow the user to change the order of the layers.
2. The LCD graphic shows how the currently selected layer will appear to the driver.
3. Standard display layers can be simply added to the display layer list by selecting the tick box.

Alarm Configuration...

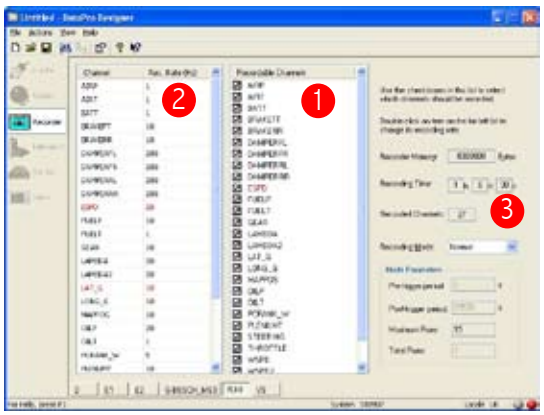
The Alarm Configuration tab enables the user to configure alarm conditions and control how warning messages and lights are displayed, and their duration:-



1. Use the Add button to create a new alarm condition or the Edit button to change an existing condition.
2. Alarms can be 'gated' - i.e. two conditions have to exist for an alarm to be activated. Use the Add and Edit buttons to create and edit conditions that other parameters can be 'gated' with.

Recorder Configuration...

The Recorder set-up tab allows the user to specify which channels are to be recorded and to set the recording frequency for each individual channel:-

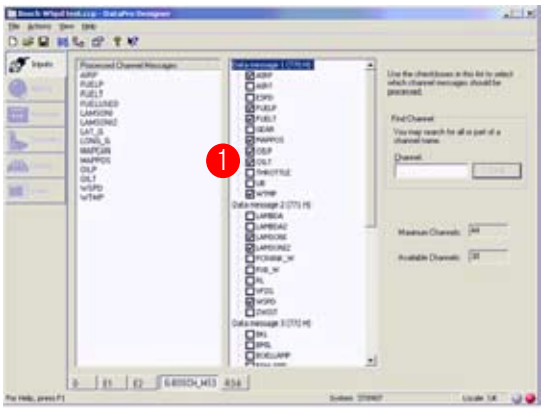


1. Select the channels to be recorded.
2. Adjust the recording frequency for each channel from the default if required.
3. The available recording time is updated dynamically as each channel's recording frequency is changed.

DataPro Designer Configuration Software

Gateway 'G' Module Configuration...

The CANBus Gateway 'G' Module acts as a bridge between a vehicle's host CANBus Network and the Stack CANBus Network employed by the data acquisition system. To correctly interpret parameters from the host CANBus, DataPro Designer software can import a proprietory Protocol from a 'Vector.DBC' file:-

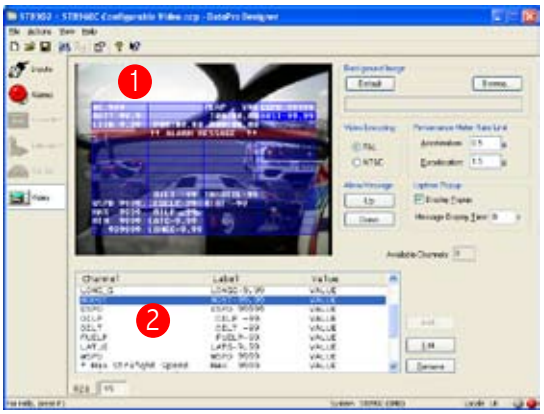


1. Once a CANbus protocol has been imported, then the Vehicle CANbus channels are selected in DataPro designer from a simple Channel pick list.

The imported CANbus protocol can be shared among any number of STACK data recording systems that are equipped with a CAN Gateway module. The Vector database file import feature is an efficient way to configure the STACK Data Recording system to interface with a proprietary Vehicle CANbus protocol.

Video Overlay System Configuration...

The Configurable version of the Video Overaly system enables users to design their own screen layouts and alarm messages :-

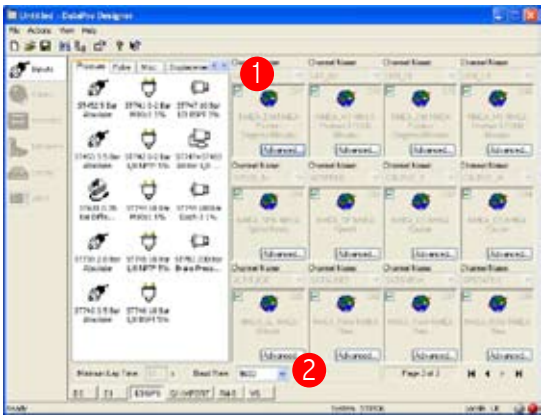


1. Select from 64 different on-screen locations for parameter displays enabling you to position important information where you choose.

2. Design your own on-screen layouts by selecting from the array of available vehicle paramters. Up to 20 parameters can be simultaneously displayed on the video screen, along with user-configurable Intelligent Alarms on all monitored parameters.

GPS Configuration...

When GPS is enabled, by default all of the GPS channels are activated and will be available on the Stack CANBus as well as to any connected recorder for recording. The user can choose to deselect specific channels and adjust the

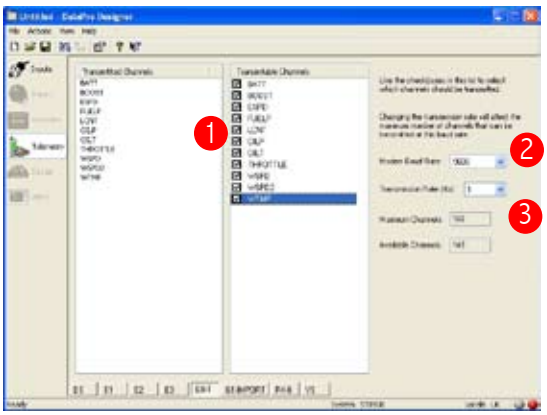


1. Review and Select the GPS channels to be collected onto the CANBus. Then switch to the Recorder configuration to select channels to record.

2. Specify the Baud Rate of the GPS system. The Baud rate is a value which describes the amount of data a comms device can carry per second. The higher the rate, the more data it can transfer.

Telemetry Configuration...

When a system comprises a Telemetry module, the Telemetry set-up tab allows the user to specify which channels are to be transferred and to set both the transfer rate and the Modem Buad Rate:-



1. Select the channels to be trasferred via telemetry.

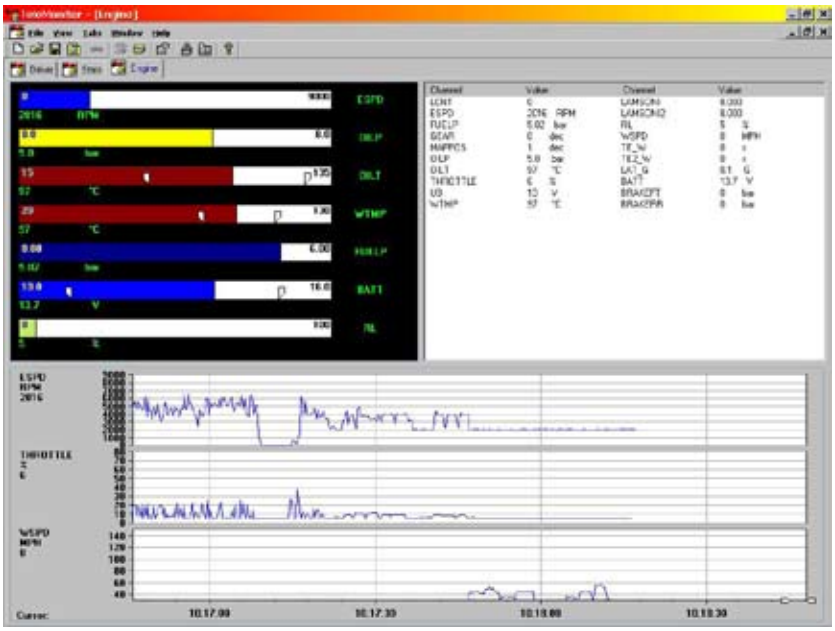
2. Adjust the Modem Baud Rate of the Telemetry system. The Baud rate is a value which describes the amount of data a comms device can carry per second. The higher the rate, the more data it can transfer.

3. Adjust the Transmission rate. A lower transmission rate will allow more channels to be transferred.

STACK STACK STACK

TELEMETRY SOFTWARE

Stack GSM/Radio Telemetry Software*



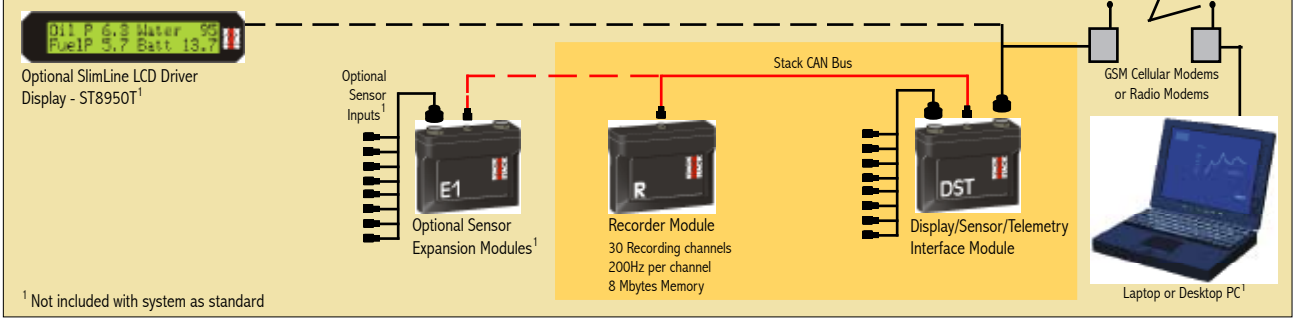
Stack TeleMonitor Software is a universal system, which supports GSM cell modems or a direct radio link. TeleMonitor is easy-to-use, with simple "Drag-and-drop" configuration. TeleMonitor supports 1 to 256 channels, with variable update rates.

Key Features include....

- Easy to use, with simple "Drag-and-drop" configuration
- Universal system supports GSM cell modems or a radio link
- Any combination of strip charts or bar graphs
- Minimum & Maximum alarms on any channel
- Multiple user-configurable, Real-tim displays
- Complete flexibility - combine vehicle CAN channels & additional sensors
- Optional driver display & recording of telemetry channels
- From 1 to 256 channels, with variable update rates
- Real-time interface to third party software applications

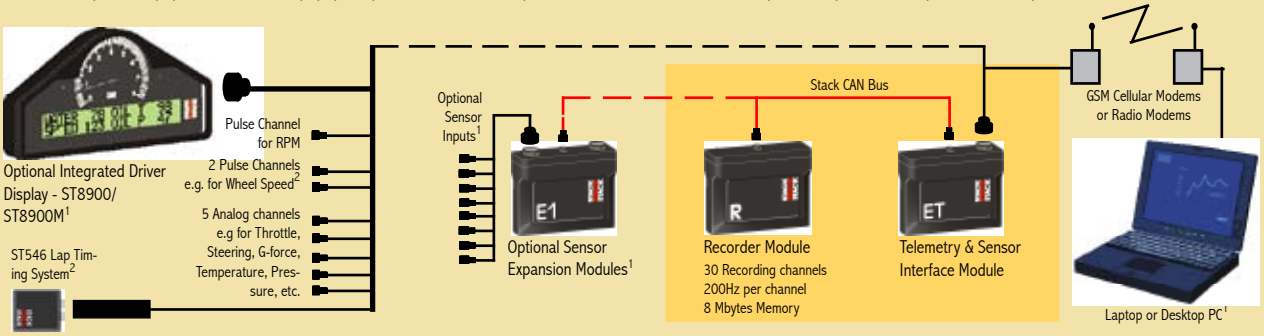
* Requires DataPro V4 U

On-Vehicle Data Telemetry System with Optional SlimLine Display



[1] Not included with system as standard

On-Vehicle Data Telemetry System with Optional Integrated Display



[1] Not included with system as standard [2] Speed Sensor and Lap Timing System included with the ST8900M. Not with the ST8900.

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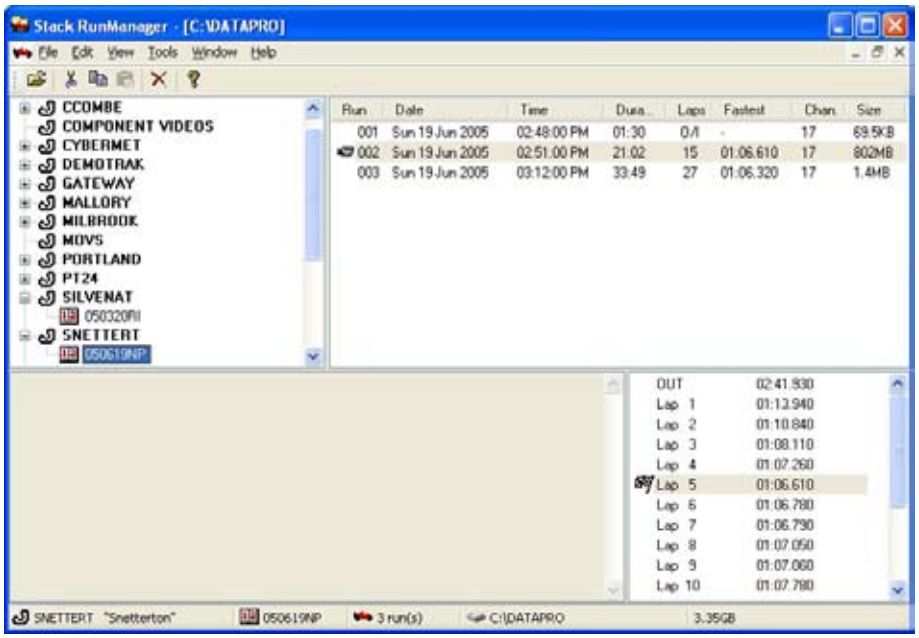
RUN MANAGER SOFTWARE

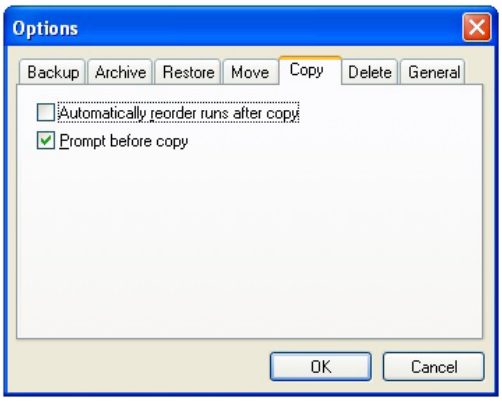
DataPro Run Manager Software



The DataPro Run Manager makes housekeeping of data easier than ever. It provides an 'Explorer' style interface for managing your data files and offers the following functions:-

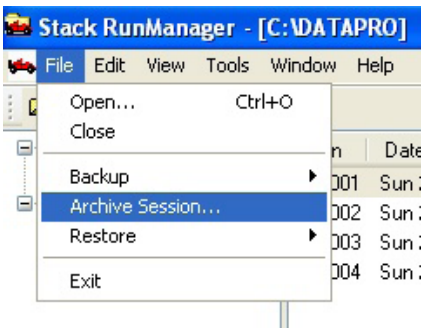
Copying and Moving Files...

The "Explorer" style interface of Run Manager allows the user to move, copy and delete files, using simple drag-and-drop functions. It provides fast and easy movement of data between networked PC's or for moving data into a different directory - for example, if the data had been inadvertently down-loaded into the incorrect directory.



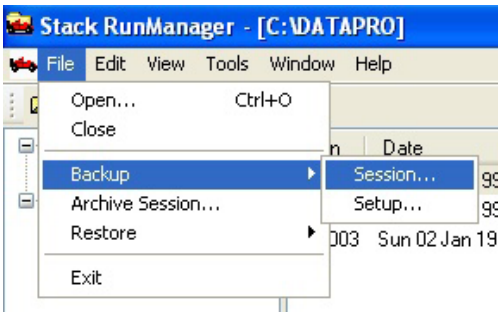
Data Archiving...

The Run Manager simplifies removal of data from the PC and the subsequent recording of that data onto any writable medium. The archiving process leaves flags in the original data directory so that the user can see the data exists but has been archived. This function operates at the session level, so by selecting a session to archive, the softare will compress and convert all runs in that session into a format that can be archived and the then re-imported at a later date for review.



Data Back-Up...

This function allows the user to copy files onto any removeable medium whilst leaving the original data in place. Because the data is automatically compressed this also provides a useful tool for moving data between non-networked PC's.



STACK STACK STACK

SYNCHRONIZED VIDEO

Synchronized Video-Logger Systems

The Stack Synchronized Video-Logger System enables up to 256 channels of data from any point on a vehicle to be recorded synchronously with video from as many as 4 cameras and 2 channels of audio.

The system uses a unique approach to enable data from our Display and Data-Logging Systems to be continuously synchronized with video and audio recorded using a standard camcorder or video recorder. For high vibration and restricted space applications, the system can also be used with our solid-state video recorder.

With the ability to see and hear exactly what was happening at any point in the recorded data, synchronized video-logging completely redefines on-vehicle data acquisition. Plus our 'Compare-Video' option enables 2 sets of video and data to be compared against distance or time, providing an invaluable new tool for the driver coach and chassis engineer.

Despite its compact size and portability, the system is also extremely rugged and will operate in extreme environments from –40°C to +80°C, making it an ideal solution for anyone collecting vehicle data.

Summary of Synchronized Video-Logger System capabilities:

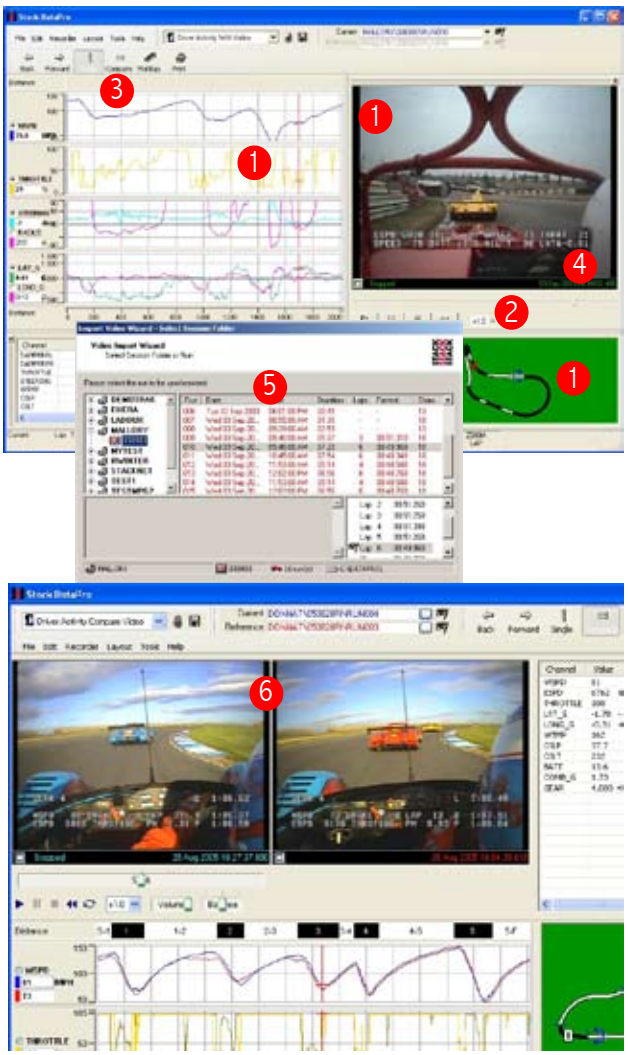
- Automatic synchronized recording and playback of video/audio and data channels
- Continuous synchronization of video and data throughout recording (independent of lap markers)
- Unlimited user-configurable layouts can include video and audio player (2 channels of audio)
- Variable video window size in each layout with automatic video import and synchronization
- Instantaneous access to video image for any point in the recorded data
- Real-time video playback with dynamic links to all other data displays
- Compare-Video option enables replay and comparison of 2 sets of video against time or distance

STACK STACK STACK

SYNCHRONIZED VIDEO

DataPro Synchronized Video Software

Synchronized Video Analysis & Lap Comparison...



1. With all display windows in the DataPro software being dynamically linked, the video can be navigated instantaneously with a single mouse-click on the track map or on the strip chart - the ultimate 'jog-and-shuttle' control, providing an ease and accuracy previously unattainable.
2. Replay the video, and listen to the audio, at speeds from 0.1x to 2.0x normal speed, using the mouse to select the point in the data to play from.
3. The 'Compare-Video' option provides comparison against distance or time to visually see different lines taken through turns, or comparison against time to easily identify the effects of time gains and losses.
4. The user configurable data overlay capability enables a video file to be saved to DVD for example, and replayed without the synchronized data.
5. The data and video are automatically synchronized continuously throughout the recording, enabling the automatic import and synchronization of the data files on the PC using a helpful import wizard, without user intervention.
6. The 'Compare-Video' option enables video and data from 2 different laps, or even different drivers, to be viewed and compared in the same file and page layout.

'Compare-Video' option with Synchronized Video provides an invaluable tool for the driver coach and chassis engineer

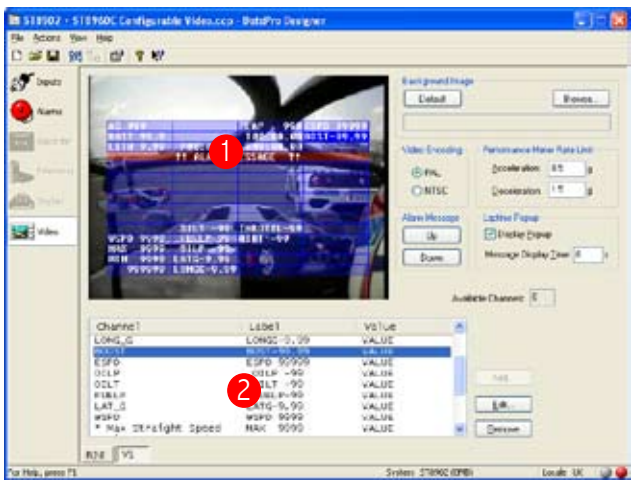
Configurable Video Overlay

The Data Overlay feature, which enables the vehicle parameters to be overlaid on the video image, is fully user-configurable. DataPro Designer Software enables you to design your own video layouts and select individual channel inputs from a wide range of sensors, with drag-and-drop selectability. The system also provides the ability to setup your own intelligent alarms on all monitored parameters.

Video Overlay System Configuration...

The Configurable Data Overaly feature enables users to design their own screen layouts and alarm messages :-

1. Select from 64 different on-screen locations for parameter displays enabling you to position important information where you choose.
2. Design your own on-screen layouts by selecting from the array of available vehicle paramters. Up to 20 parameters can be simultaneously displayed on the video screen, along with user-configurable Intelligent Alarms on all monitored parameters.



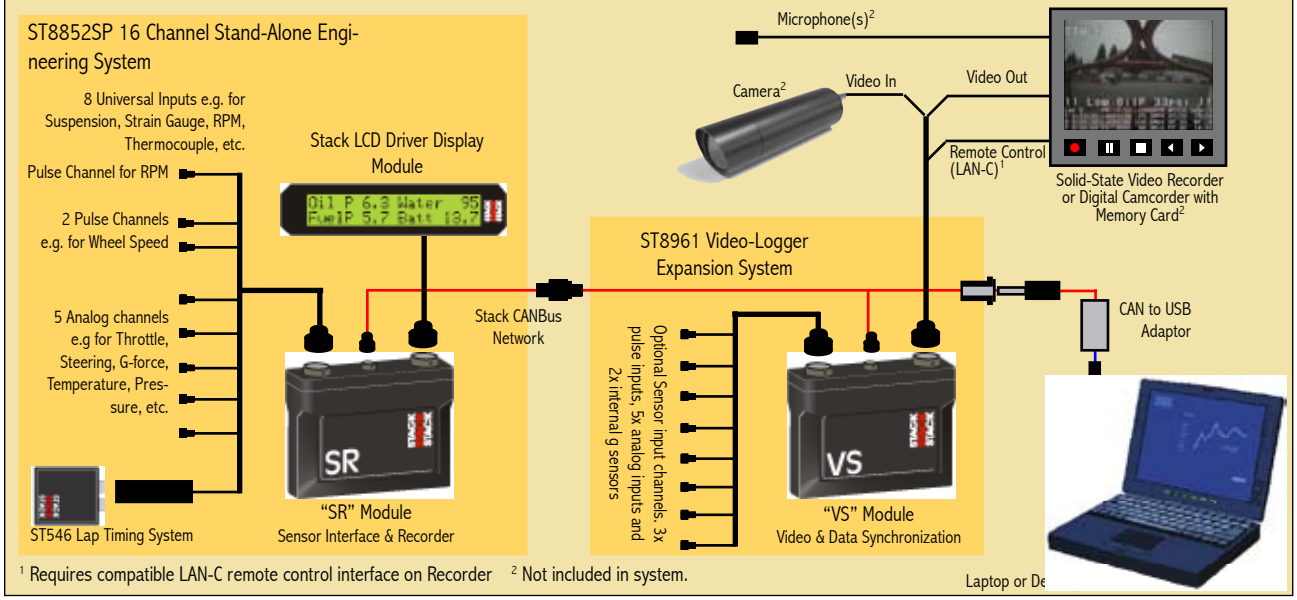
STACK STACK STACK

SYNCHRONIZED VIDEO

STAND-ALONE SYNCHRONIZED VIDEO-LOGGERS

The ST8961 Video-Logger Expansion system can be used with any of Stack's Stand-Alone Engineering Systems, to create a Synchronized Video-Logger System with 8 to 32 channels, or a custom system with up to 256 channels. The 'VS' module connects between a remote mounted camera[2] and a digital video recorder[2]. The 'VS' module also enables the Engineering system to automatically control recording on the video recorder[1]. An optional ECU interface (CAN or RS-232) is also available.

STAND-ALONE SYNCHRONIZED VIDEO-LOGGER SYSTEM ARCHITECTURE

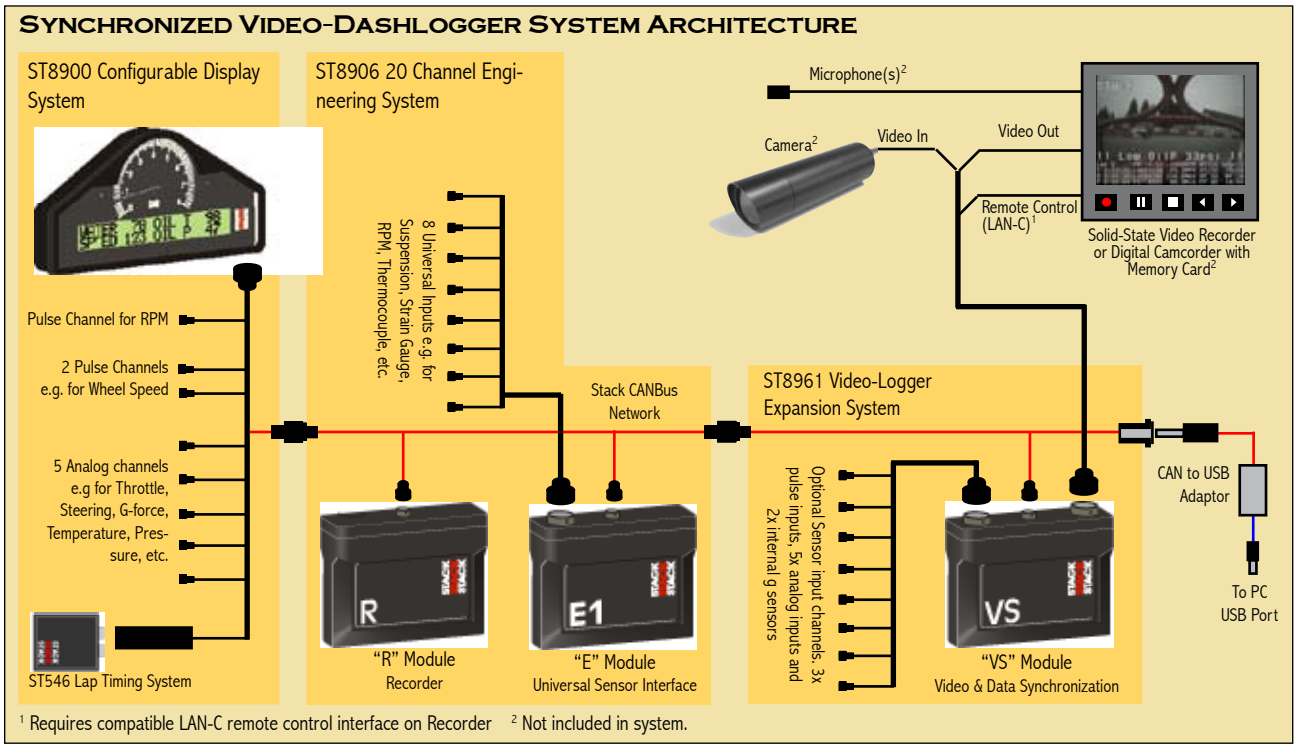


[1] Requires compatible LAN-C remote control interface on Recorder [2] Not included in system.

SYNCHRONIZED VIDEO-LOGGERS

Synchronized Video-loggers can be created by adding the ST8961 Video-Logger Expansion System to any Stack Dashlogger system e.g. ST8802/3 and ST8102S. Alternatively a customized Video-logger system of up to 256 channels can be built up from a Steering Wheel or Display system (e.g. ST8100, ST8130, ST8900, ST8600), an Engineering System (ST8902- ST8909) and the ST8961 Video-Logger. The 'VS' module connects between a remote mounted camera[2] and a digital video recorder[2]. The only other connection is a single 4 way connector to the CANBus network on the existing harness of the Dashlogger or Engineering System.

SYNCHRONIZED VIDEO-DASHLOGGER SYSTEM ARCHITECTURE



[1] Requires compatible LAN-C remote control interface on Recorder [2] Not included in system.

Harsh Environment, Solid-state Digital Video Recorder (DVR)

Compact & Rugged High Quality MPEG2 Digital Video Recorder...

For high quality video recordings on the move, the miniature Solid-State Digital Video Recorder (DVR) from Stack provides the optimum solution and is specifically designed for use in harsh environments. The DVR employs broadcast standard MPEG-2 video compression to record high quality real-time video and audio direct to a PC flash card. This card can be removed with ease and played on a PC or laptop using a standard media player application.

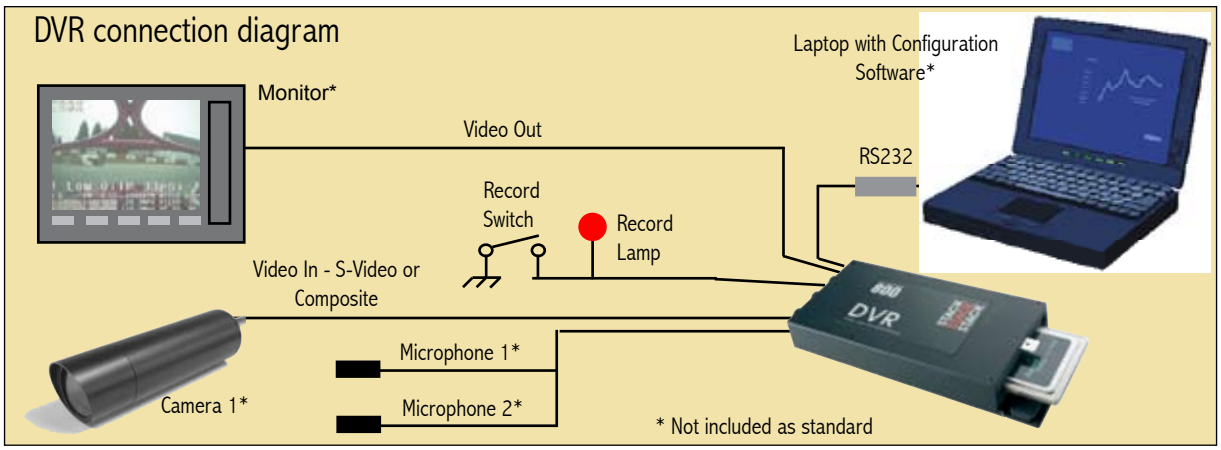
The Stack DVR is housed inside a ruggedized and sealed enclosure, specifically designed and manufactured to protect the unit in harsh and extreme environments. The unit is compact and durable with no moving parts (other than the sealed flash card access door), and is capable of operating where normal VCRs or DV recorders are not. Recording in harsh environments, such as continual shock and vibration and extreme climate conditions is now entirely possible, making it ideal for all mobile and on-vehicle video recording applications.

A data overlay feature is also provided so that date and time may be stamped onto the recorded video. Recordings can be archived direct to DVD for playback on either a PC or a DVD player.

The Stack DVR can be used as a stand-alone harsh environment, solid-state Digital Video Recorder, for use with other video systems. We can also supply the DVR with a video kit incorporating a bullet CCD camera (pictured over), and even a full, Synchronized Video-Logger System, complete with modular data acquisition from 8 to 256 channels.

Key Features include....

- Real-time MPEG-2 compression of video & stereo audio
- Record to removable PC-Card (PCMCIA) flash disk, playable on a PC/laptop. Can be burnt to DVD
- Completely sealed to IP67
- Operates in temperatures of -20ºC - +70ºC
- Up to 8GB of memory, providing up to 4 hours of high quality, full resolution recording
- Optional line & mic level, stereo audio recording
- 6.5 - 20V DC powered, suitable for all mobile applications
- Rugged, small and lightweight with no moving parts



DVR specifications

General		
Operating temperature range	-20ºC to +70ºC (extended range possible)	
Mechanical size		151 (160 inc. connectors) x 76 x 20.5 mm
Finish		Hard black anodised aluminium
Weight		300g (approx.) without card
Operating voltage range	6.5 to 20 Volts DC	
Reverse/Over-voltage protection		-60 Volts to +60 Volts DC
Power consumption		~3.0 Watts (~250 mA at 12 Volts DC)
Standby battery		Expected life > 5 year
Sealing		IP 67
Humidity		0-100% RH
Vibration		20g 50-2000Hz swept Sin. 12Hr x 3 axis
Radiated Emissions		EN55024B CISPR25
Radiated Immunity		50V/m
Conducted Immunity		DIN40839 Cat IV
Disk Interface:		
Disk Interface	PCMCIA	
Maximum address range	32 GB	
Disk supply voltage		3.3 Volts
Disk format		IBM PC, FAT-32
File format		MPEG-2, Windows Media Player compatible
Misc:		
Record switch input		TTL compatible, with 100k pull up to 3V3
Record OK output:		Open collector (12V Max)

Video	
Video standards supported	PAL (625 lines), NTSC (525 lines), Composite & S-Video
Video frame rate	PAL 25fps, NTSC 30fps
Video input level	1 Vpp, 75 Ohm, ±10%
Video monitor output display)	1 Vpp, 75 Ohm, ±10% (includes on-screen
Power up to record time	< 2 seconds

Digital sampling:

Resolution	PAL	NTSC
Full	720 x 576	720 x 480
Medium	480 x 576	480 x
Small	352 x 576	352 x
Smallest	352 x 288	352 x

Record Time: (minutes/GByte)

	Recording Quality			
Resolution	Low	Medium	High	Highest
Full	55	39	30	24
Medium	70	48	37	30
Small	83	60	47	39
Smallest	111	83	66	55

Audio:	
Number of channels	2
Input Level	Mic or Line Level. +3 to -30dBV (adjustable)
Input impedance	> 10 K Ohm
Mic bias	3.3 V DC, 1 K Ohm
Audio monitor output	0 dBV (nominal)
Audio monitor output impedance	< 100 Ohm

High-resolution 1/3" colour CCD bullet camera (weatherproof version)

Stack offer a high-resolution, miniature bullet camera for use with the harsh environment DVR. The camera is weatherproof and supplied with a replaceable lens cover, in case of damage. Different lens options are available, and with a universal mounting structure, this makes a truly flexible and easy to instal camera. Comes complete with connections suitable for direct connection to the Stack DVR.

Bullet camera specifications

Image Sensor	High Resolution, 1/3" DSP Colour CCD	
High Resolution		480 TV Lines
Effective Pixels	PAL: 752(H) x 582(V) / NTSC: 768(H) x 494(V)	
Min. Illumination		0.5 Lux at F2.0
Power Source	12V DC (operating range: 8V-15V)	
Operating Current		130mA w/regulated power input
Operating Temperature		-10ºC to +50ºC
Humidity		Within 90% RH
Dimensions(mm)		21(diameter) x 71 (length).
Weight (g)		210
Standard Lens (focal length)	4.3mm (78º FoV).	
Lens Options (focal length)	2.9mm (120º FoV) or 8.0mm (39º FoV)	

Video & Data Overlay System

The Stack Data Overlay Video-Logger system transforms your in-car video system into a powerful Data-Logging system without the need for a PC. Real-time performance data is overlaid on the video picture along with engine parameters and driver activity channels. User-configurable alarm conditions ensure instances of over-reving, low pressures or high temperatures, are quickly and reliably found.

You can now see RPM, speed, gear, throttle angle and brake pressure for every point on the track. Note your maximum speeds in the straights and minimum speeds through each corner. Our patented Performance Meter and Predicted Lap Time displays enable you to see exactly where time has been gained or lost on the track compared to the fastest lap to date. The lap number and lap time aid in navigating through the video, while the lap distance channel enables the same spot on the track to be identified, for accurate lap-to-lap comparison.

You can configure the system to start and stop the video recorder automatically*, ensuring video and data are always recorded. Alarms for temperatures and pressures can be configured to pop-up on the video display. The unique Alarm Counter display enables you to instantly check the end of the recording to determine how many alarms, if any, have occurred, and to rapidly locate each alarm using the video jog/shuttle. When the engine stops, the display automatically changes to display the peak values for each channel e.g. maximum temperatures and minimum pressures, allowing for instant review when the car comes in.

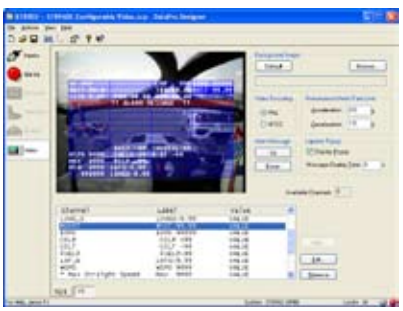
*Video recorder requires compatible LAN-C remote control interface

Summary of Video-Logger System capabilities...

- Compatible with most race video systems - connects between camera and recorder
- No PC required - set up via on-screen menus on video recorder
- Automatic start and stop of video recorder based on RPM*
- Peak value display for all parameters at end of video recording
- Configurable alarm messages for engine temperatures & pressures pop-up on video screen
- Alarm counter enables rapid navigation to each alarm using jog/shuttle
- Use with dedicated sensors or connect to an existing Stack display, steering wheel or logger
- PAL or NTSC models

Configurable Video Overlay System

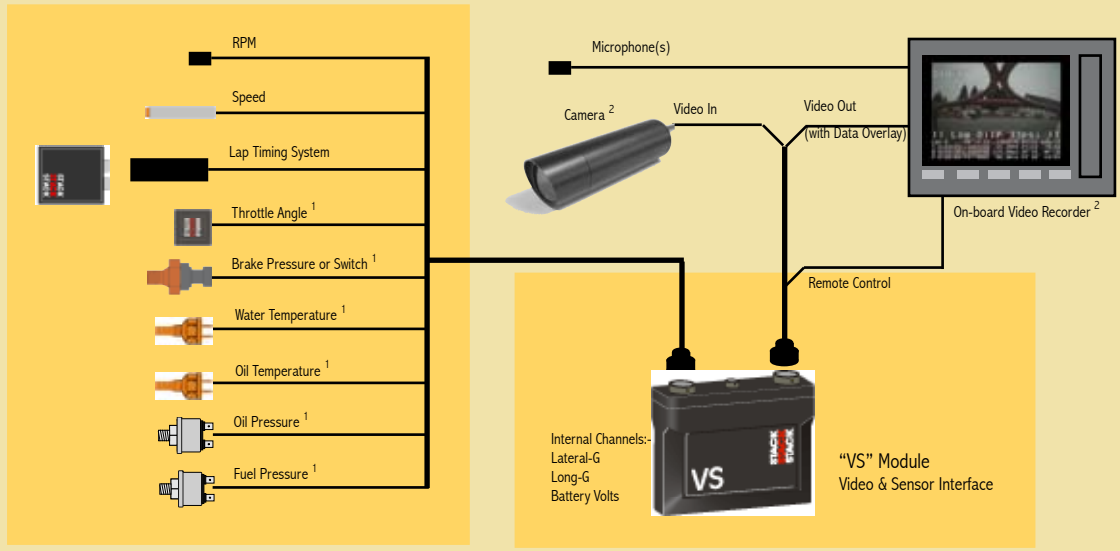
A User-Configurable version of the Video Overlay System is also available. Supplied with DataPro Designer Software, the Configurable Video Overlay System enables you to design your own video layouts and select individual channel inputs from a wide range of sensors, with drag-and-drop selectability. The system also provides the ability to setup your own intelligent alarms on all monitored parameters. See the DataPro Designer pages for more information.



VCR Video-Logger Stand-Alone Systems

The Stand-Alone VCR Video-logger connects between the remote mounted camera and the video recorder. It has dedicated sensor inputs for RPM, Speed, 2 temperatures, 2 pressures, throttle angle, and brake pressure (or brake switch). It also monitors lateral-G, long-G and battery volts internally. The system is easily configured using on-screen menus on the video recorder and a plug-in 3-switch box - without the need for

Stand-Alone VCR Video-Logger System Architecture

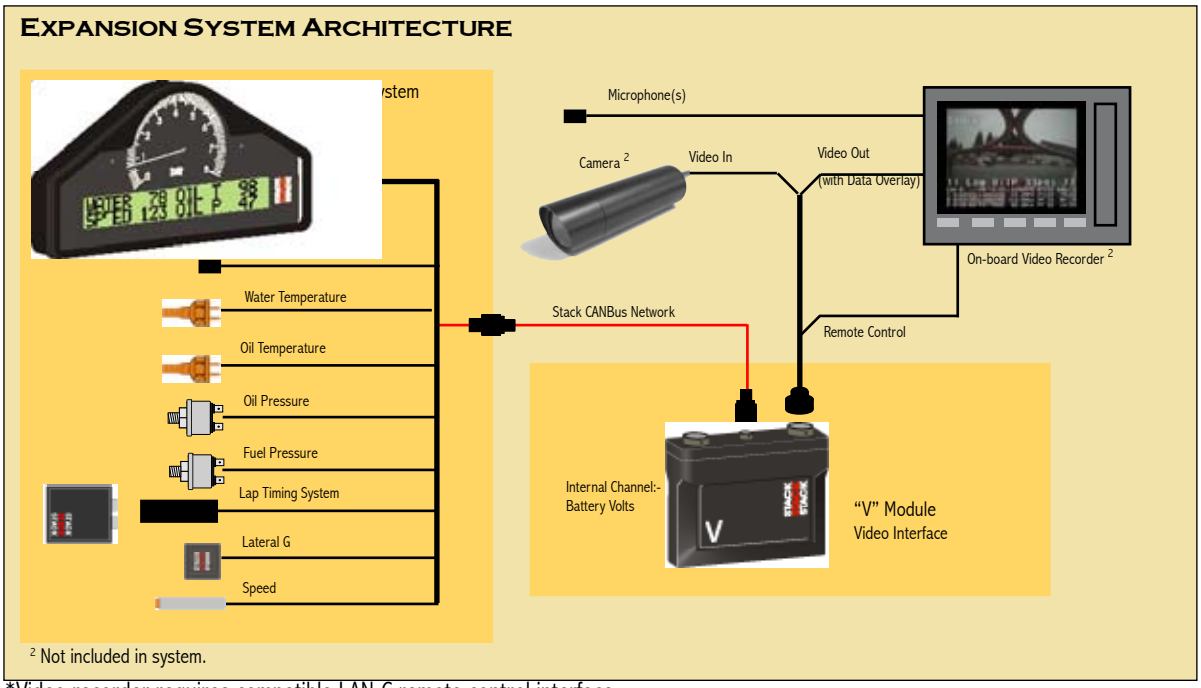


1 Sensors are optional extra on some models. 2 Not included in system.

VCR Video-Logger Expansion Systems

The Video-logger Expansion System connects between the remote mounted camera and the video recorder. The only other connection is a single 4 way connector to the CANBus network on the existing harness of a Stack display, steering wheel, or logging system. This provides both power for the system and data for RPM, Speed, 2 temperatures, 2 pressures, lateral-G, battery volts and lap times, saving on the duplication of sensors and simplifying installation. The system is easily configured using on-screen menus on the video recorder and a plug-in 3-switch box - without the need for a PC!

Expansion System Architecture



2 Not included in system.

*Video recorder requires compatible LAN-C remote control interface

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