Interactive, In-Vehicle, Web-Enabled Data Acquisition System with GPS

The Web-Enabled Data Acquisition System (WEDAQ) provides in-vehicle data acquisition and positioning information with remote real-time access to other geographical locations via the Internet.

Streaming data is available during tests and stored data files are available for previously completed tests.

WEDAQ is a self-contained system, requiring only 12 VDC battery connections and user-specified sensors for monitoring vehicle performance.

The WEDAQ hardware is located in the vehicle, termed the local side of the system. Remote users require an Internet connection and Microsoft Internet Explorer standard Web browser.
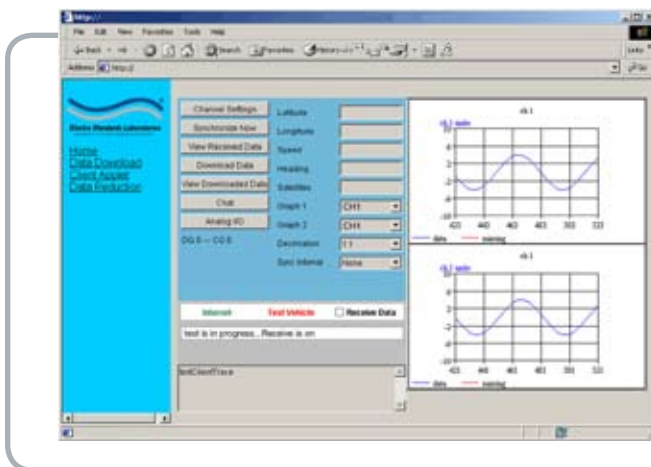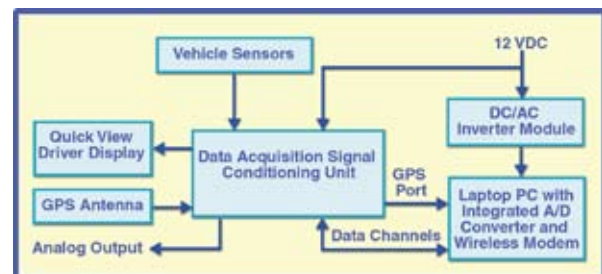
WebDAQ Software !
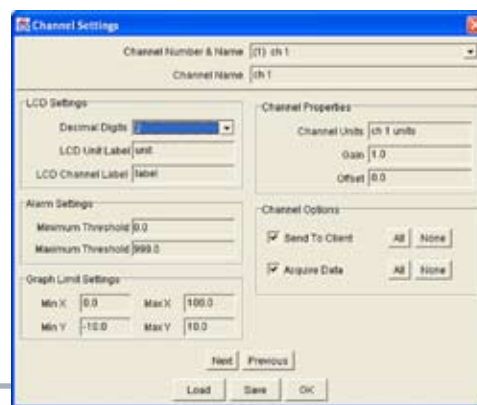
System Components

• Data Acquisition Signal Conditioning Unit accepts 16 channels of analog inputs. Provides gain, filtering, and signal buffering of the analog voltages and passes them to the A/D converter in the laptop PC. Drives an LCD indicator for viewing data and contains a GPS unit. An analog output is provided for general usage.

• Laptop PC with Integrated A/D and Wireless Modem serves as host platform. Provides data digitization and local data storage of all sensed channels. Acts as conduit for remote Internet access to streaming data and archived test data. Internet access achieved with a wireless modem integrated into laptop PC.

• DC/AC Inverter Module uses 12 VDC vehicle voltage to generate a standard AC voltage to power laptop PC.

• Quick View Driver Display is mounted in a small box that is cabled to the DAQ. Features LCD display that can be set to show current value of any sensed signal during a test.

• GPS Antenna gathers satellite info for global position subsystem within the data acquisition signal conditioning unit.

• Vehicle Sensors are user-supplied sensor inputs to the data acquisition signal conditioning unit that monitor desired vehicle parameters or performance. These signals are processed, digitized and stored for analysis.

Architecture Overview

The local side is an enhanced in-vehicle acquisition system that stores all data to a local file on the computer hard drive. Files are automatically created after each test. The real-time plots allow the local user to graphically monitor the evolution of any signal channels. Similarly the dash display unit allows the user to numerically monitor any combination of input signals on an LCD display. Selected data is also processed and routed to the Internet communications channel for remote users.

Using a Web browser, the remote user receives a real-time data stream from the test in progress. Real-time streaming data is automatically saved on the remote computer's hard drive. Previously stored test results on the local side computer can also be retrieved and viewed by the remote computer for immediate analysis. System setup parameters are incorporated into the local side of the system, but can be modified by either the local side user or the remote side user. Data viewing selections do not affect local data acquisition and file creation.
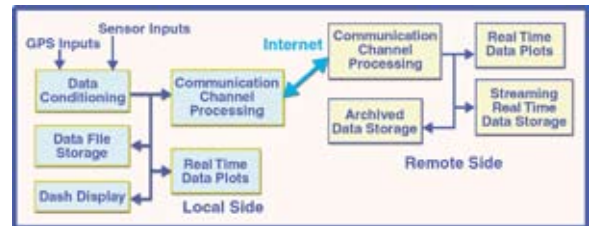
Hardware Specifications

Transducer Connectors
- 16 Input Channels
- +/-10V Analog input full scale
- +/-15 VDC Excitation at 110mA per channel
- +5 VDC, +10 VDC Excitation available, jumper selectable with DAQ signal conditioning unit.
- Input can be configured for direct strain gauge interfacing. Consult ESL.
- Mil Spec Connector: Cannon Part # MS3112E10-6S
- Mating Connector: Cannon Part # MS3476L10-6P

Transducer Input Connector Pin Out	
A	+15VDC Excitation (+5V, +10V)
B	+Signal
C	- Signal
D	Excitation Common
E	No Connect
F	- 15 VDC Excitation

I/O Connectors
- Isolated analog output voltage, 0-10 V. Configurable to 0-5V, +/-5V, +/-2.5V
- Connector: DB-25F

I/O Connector Pin Out	
19	Vout (isolated)
21	Vout GND (isolated)
Others	Reserved

Serial Connectors
- Serial connectors are GPS serial ports.
- Port A is used to configure GPS (factory set)
- Port B is used to obtain GPS data
- Connector: DB-9F

Pin	Connector A	Connector B	Pin	Connector A	Connector B
1	No Connect	No Connect	6	No Connect	No Connect
2	GPS-TDI	GPS-TD2	7	No Connect	No Connect
3	GPS-RD1	GPS-RD2	8	No Connect	No Connect
4	No Connect	No Connect	9	PPS	PPS
5	GND	GND			

Serial Connectors Pin Out

Analog Output Jumpers

JP12	JP11	Output Range (V)
Open	Open	0 to 10 (default)
Open	Closed	0 to 5
Closed	Open	- 5 to +5
Closed	Closed	- 2.5 to +2.5

Typical Sample Rates (Samples per second)

500	250	100	50	20	10	5

In addition, all other user-selectable rates are available.

The View Connector connects the Data Acquisition System to the Dashboard display unit. The connector is a DB-25F. All pins are reserved. Power to the Data Acquisition and Signal Condition Unit is nominal 12 VDC, 9 VDC-18 VDC Range. Unloaded nominal Current Draw 2.5A at 12 VDC. Software settings can be used to alter the gain and offset of each channel.