

Data Acquisition

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DAQ



Industrial applications of Data Acquisition (DAQ) are many and varied. ITI has developed custom data acquisition systems for a number of clients, ranging from several low-rate temperature channels though to 32 channels at KHz rates and varied signal sources.

Signal Conditioning hardware can be designed and built to meet the needs of the application. Client logos / brand graphics can also be incorporated in the enclosure and label designs giving a very professional appearance to the finished data acquisition or testing system.

Data Acquisition hardware is generally selected based on the measurement requirements such as channel count, acquisition rate and measurement resolution etc. Computer interface options also depend of the nature of the application and include Ethernet, USB, serial and parallel. In some instances stand-alone logging (i.e. without a PC) is appropriate such as environmental monitoring over several days or weeks.

Standard acquisition software is occasionally suitable, otherwise bespoke software can be created using a number of applications such as labVIEW, Visual Basic and MS Office DDE. labVIEW is particularly powerful and supports communication with the majority of data acquisition systems. Customised screens can be created to display your captured and processed data in the way you require. Again company graphics can be incorporated presenting a very professional image to your clients.

Example 1: Water Pump Testing Systems

We have co-developed a range of water pump testing solutions for Munster Simms Engineering including laboratory based Life, Field and Performance-testing of product and prototypes. Data acquisition and collection is made using Ethernet hardware and received by one computer across a LAN. Data is continuously displayed providing pump status, performance and alarms, while archiving data for future reference. Five parameters - Voltage, Current, Pressure, flow and Temperature - are regularly recorded throughout the accelerated tests, providing a vital source of reference data for Development and Field Support engineers.



Field Test Rig

The Field Rig is PLC controlled and cycles two submersible pumps through water and air tests. Five parameters per pump are measured and recorded, as are two other digital signals indicating if the pumps are in air or water, and if a solenoid valve is open or closed.

Two portable testing systems have also been built: one low-speed serial acquisition system measuring seven pump parameters, and a second USB based high-speed system for pump performance evaluation.



Pump Life Testing & Customised Signal Conditioning



Performance Rig

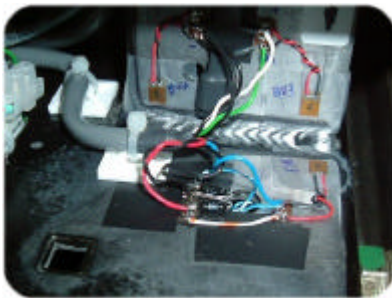


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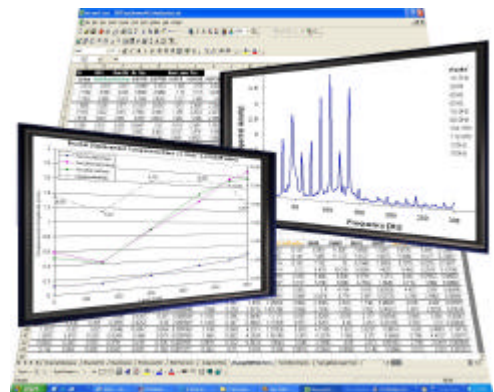
Example 2: Generator Design Evaluation

Following a previously successful data acquisition and analysis project for Wilson Double Deck, FG Wilson (Larne) approached ITI for assistance with evaluating generator designs through measurement of vibration and stress levels in elements of two different models for the US market - 550kW & 600kW.



Through discussions it was agreed what data was required; an appropriate test regime was detailed and sensor types selected. But just as important was a careful preliminary assessment of where the sensors were to be positioned to ensure important structural behaviour was not missed. For the two generators, a little over two weeks was required to install, check and calibrate the sensors, including 30No. Strain Gauges, 3No. Bolt Tension sensors, 2No. Vibration sensors, and 1No. Linear Displacement sensor.

Data collection took almost two weeks in total, and led into extensive analysis and interpretation of the large volume of data. Processing with MatLab and Excel included looking at stress in the engine-generator coupling, terminal enclosure panels and bolts. Resonant frequencies were plotted from data using FFT, and fatigue life calculations carried out using Basquin's Law. A report and presentation was given to FG Wilson and one of its suppliers, the outcome of which enabled the generators to be launched in the US.



If you wish to find out how ITI can help you with any measurement or control issues, please feel free to contact us 028 9337 3379 or projects@innovation-tech.co.uk Check out www.innovation-tech.co.uk to see what other areas ITI operate in.



Whatever your engineering problem, ITI have a solution.

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