

## **Data Logger [definition and description]**

The term data logger (also sometimes referred to as a data recorder) is commonly used to describe a self contained, stand alone data acquisition system or device. These products are comprised of a number of analog and digital inputs that are monitored, and the results or conditions of these inputs is then stored on some type of local memory (e.g. SD Card, Hard Drive).

Though they can be deployed while connected to a host PC over an Ethernet or serial port a data logger is more typically deployed as stand alone devices. Once the application is programmed into the unit, it is placed in location, the various input (and output) signals are connected and the logging application is started. Sensors commonly connected include: Thermocouples, RTDs, Thermistors, strain gages, load cells, pressure sensors, event counters such as turnstiles, liquid level and many more. (Some smaller units are designed to simply monitor temperature and RH, and require no external connections at all).

A Data logger is used where a full PC-based DAQ system is not possible or desired. Often this can be because the installation is in a hostile environment that most PCs cannot tolerate or because a PC-based data acquisition system would simply be too large. Unfortunately, security is also frequently a consideration and though the more powerful devices may be valued at many thousands of dollars, they are not as prone to theft as there is not too much use for a stolen data logger in the home and their may not be much of a market for "hot" units.

Examples of where these devices are used abound. A few of these examples are shown below:

- monitoring temperature, pressure, strain and other physical phenomena in aircraft flight tests (even including logging info from Arinc 429 or other serial communications buses)
- Monitoring temperature, pressure, strain and other physical phenomena in automotive and in-vehicle tests including monitoring traffic and data transmitted on the vehicles CAN bus.
- Environmental monitoring for quality control in food processing, food storage, pharmaceutical manufacturing, and even monitoring the environment during various stages of contract assembly or semiconductor fabrication
- Monitoring stress and strain in large mechanical structures such as bridges, steel framed buildings, towers, launch pads etc.
- Monitoring environmental parameters in temperature and environmental chambers and test facilities.
- replacing older, paper based chart recorders

These are only a few of the various applications which count on a data logger to record and store data. Almost any time something needs to be measured and the data stored for future reference, one of these flexible units may fit the bill.

Software for most data loggers comes in the form of a simple “canned” configuration application that allows the user to select the inputs to be logged, the signal conditioning or linearization required, the sample rate, alarm conditions etc. Also the software needs to define how the logging application is to be started (e.g. time of day or based on a button push) and how it will be ended (e.g. in four hours, at a certain date/time or on an alarm condition). The software may also allow the user to select alarm conditions which may be used to control one or more outputs that can be used to notify of the alarm or even perform an emergency shut down of the system. Finally the application software typically is used to help the user download the data from the logger into an application that is used to analyze the logged data (e.g. Excel, MATLAB).

Many systems offer a fixed configuration where the number and type of inputs (and outputs if applicable) cannot be changed. More powerful loggers such as UEI’s UEILogger series allow the user to configure the data logger I/O to match the actual application’s requirements.