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Study of Data Logger

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Abstract— This paper describes a detail explanation about data logger system. A data logger is an electronic device that combines analog and digital measurements with programming methodology to sense temperature, relative humidity and other parameters such as voltage and pulse. The data loggers take input from the thermocouple temperature and humidity and other sensors. Knowledge of temperature and relative humidity course during a certain time is needed in scientific, medical and industrial applications.

Keywords— Introduction, History of Data logger system, Operation of Data logger, Characteristics of Data logger and its advantage, future scope, References.

I. Introduction

In today's world there are many systems whose data is needed to be continuously collected. This data should be in form of log by which time, occurrence and other specifications can be collected at one place. All of this information is collected manually on field which consumes both time and workforce. In some situation it is not possible to retrieve this data because of extreme environment or remote location. Data logger is a different than typical data acquisition. It has ability to log data automatically on a 24-hour basis. Once it deployed and left unattended to measure and record information for the duration of monitoring period A complete data logging application generally requires most of the elements or components illustrated below.

1) Sensors: The inputs from various sources are given to the data logger through various
sensors to measure various parameters such as temperature, humidity where electrical

signals are converted to temperature and humidity values.

2) User Interface: The interface for interaction with the software and sensors is provided
and using implemented algorithm analysis is done for storage of data.

3) Software: It displays the information stored from sensors for and also maintains data for
long time storage.

Fig.1: Data Logging System

II. History of Data Logger

Chart recorders are electromagnetic devices that monitor and record conditions using built-in pens that chart the data on paper. The most famous example of these devices is the polygraph machine which was used in real life and could sometimes be seen in a TV show or movie.

*The first data loggers: Data loggers have greatly improved on the capabilities of the chart recorder. The main upgrades include their small size, their ability to run constantly on battery power, and the improved accuracy of the sensors. The biggest upgrade though is that data loggers can gather data and process it into
a digital format. This eliminates the need for the pens and paper used by chart recorders and the physical storage space needed to save all the data from these earlier devices run constantly on battery power, and the improved accuracy of the sensors. The biggest upgrade though is that data loggers.

*Today's digital data loggers: Data loggers have continued to get smaller and provide more capabilities as the 21st century moves along Early data loggers included a display on the device itself or users had to plug into the device to download the data. This is no longer necessary. Many modern data loggers are Bluetooth-connected or are directly connected to the internet.

III. Operation of Data logger

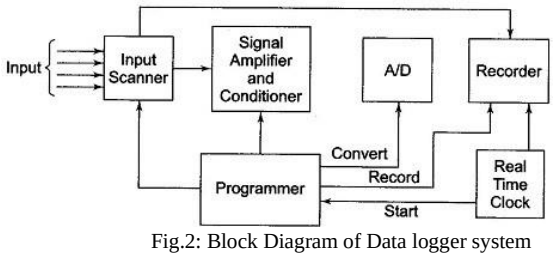


Fig.2: Block Diagram of Data logger system

3.1 Input Scanner: The various input signals fed to the input scanner are temperature, pressure, vibrations, ON/OFF signals etc. The input scanner
is an automatic switch that can select only one input signal at a time. In modem scanners the rate of scanning is up to 150 inputs.

3.2 Signal Amplifier and Conditioner: The input signal selected by scanner is a low-level signal. Hence a signal amplifier is used to amplify the low-level signal so that the input signal is maintained at 5 V level. The signal amplifier should possess certain characteristics like precise and stable D.C gain, high signal to noise ratio, good linearity, high impedance etc. The signal conditioner is placed between scanner and analogy to digital converter. It is a linearising circuit i.e., if a signal varies nonlinearly with respect to the measured parameter, then linearization of signal is done by the signal conditioner.

3.3 Analog to Digital Converter: The data loggers handle the data only in digital form and hence the analogy signal, if any, must be converted into digital form by employing analogy to digital converter The digital technique is used because it measures very small signals without loss of accuracy. The analogy signals that are converted to digital form are suitable to drive the digital recorders.

3.4 Recorder: The data logger drives the output recorder which prints the signals obtained from the analogy to digital converters. The recorder may consist of either typewriter or a punched tape. The typewriter provides a conventional log sheet with results in tabular form. Punched paper tape is used when the recorded data must be analysed further in a digital computer.

3.5 Programmer: It controls the sequence of operation of all other units of data logger. It takes information from input scanner, analogy to digital converter and recorder. The programmer performs various functions like starting analogy to digital conversion, selecting input signal by scanner, recording, and displaying reading, resetting logger etc.

3.6 Clock: The logging sequence is started automatically by a clock. The clock is used to automate the entire data logging system. When the clock signal is generated the scanning operation is started then the data logger advances ahead by time. The clock gives command to the programmer to start logging sequences at the intervals selected by the user.

IV. Characteristics of Data Logger

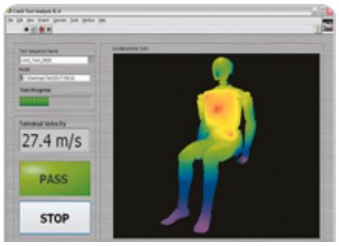
1) Modularity: Data loggers can be expanded simply and efficiently whenever required,
   without any interruption to the working system.
2) Reliability and Ruggedness: They are designed to operate continuously without interruption even in the worst industrial environments.
3) Accuracy: The specified accuracy is maintained throughout the period of use. Management Tool: They provide simple data acquisition and present the results in
   handy form.
4) Easy to use: These communicate with operators in a logical manner, are simple in concept, and therefore easy to understand, operate and expand.

V. Advantages

1.InlineAnalysis:

Data analysis with a traditional stand-alone data logger is typically performed offline only after the data has been transferred to the PC. Using a Paused data logger, you can take advantage of multicore processors and increasingly available RAM in the PC to perform signal processing and analysis on

your data as you acquire it. LabVIEW includes many common math and signal processing functions that use configuration wizards and make it easy to add analysis to your measurements.

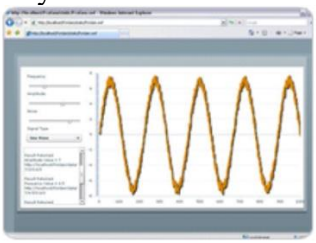


2.User Defined Functionality:

With a traditional stand-alone data logger, you are generally limited to hardware and software functionality defined by the vendor. These functions are good for accomplishing general-purpose tasks, but they may not help you meet your unique application requirements. For example, you may want to log data only under certain conditions or generate custom alarms that aren't built into the data logger. PC-based data loggers are software defined instruments. This means the functionality of the device is defined by the software, and you can customize the software to meet your specific application needs. Using LabVIEW, you can easily build functionality for custom alarms, logging conditions, report generation, and signal analysis. You can log data to virtually any file format for importing into other tools and sharing data with others.

3.TerabytesofDataStorage:

Data storage is an important component of a data logger. You can log only as much data as you can store in your data logger. Traditional stand-alone data loggers are limited by the amount of memory built into the device. Because the PC is a part of a PC-based data logger, you are limited only by the amount of hard drive space on the PC. Today, it's not uncommon to find a PC hard drive with terabyte capacity that provides ample space for your current measurements as well as permanent storage space.



4.NetworkConnectivity:

For applications that require long-term monitoring over days or weeks, you may have difficulty continually checking results. Remote monitoring is useful because you can see

results from a remote location. Using a PC-based data logger, you can take advantage of the PC's network connectivity to transmit results over a network for remote viewing. With LabVIEW, you can create custom alarm conditions that send e-mails or even design a Web service that you can visualize over a Web-based application.

V. Future Scope

Using data logging, scientists and engineers can evaluate a variety of phenomenon, from weather patterns to factory performance. PC-based data logging systems provide most flexibility, customization, and integration. To define a data logging system, we must evaluate
all the requirements for acquisition, analysis, logging, display, and report generation. Based on these requirements, we can customize data logging software and hardware to meet any needs.

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