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An Introduction of Data Logger Management Centre

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Abstract— *In this paper we are an introduction of Data Logger Management Centre. Data logger system helps in finding-out the mistakes done by signal operators, loco pilots and the misbehavior of signaling systems. Thus are helping railways in preventing accidents and also reducing detentions to train services. Data logger is placed in the relay room. Data logger monitors the relay status and records its change with time stamp. Each data logger has number of data output ports for communicating the recorded information to the Central/ Local Fault Analyzing System. Data loggers are networked in daisy chain to a Front End Processor provided in central location, usually, divisional control office.*

Keywords— *Signal, realy room, data, control, time stamp, records.*

I. INTRODUCTION

Data Logger is a microprocessor based system, which helps in analyzing the failures of the relays interlocking system/ Electronic interlocking system. A Data Logger (also Data Logger or Data Recorder) is an electronic device that records data over time or in relation to location either with a built in instrument or sensor or via external instruments and sensors. Increasingly, but not entirely, they are based on a digital processor (or computer). They generally are small, battery powered, portable, and equipped with a microprocessor, internal memory for data storage, and sensors. Some data loggers interface with a personal computer, and use software to activate the data logger and view and analyze the collected data, while others have a local interface device (keypad, LCD) and can be used as a stand-alone device. Data loggers vary between general purpose types for a range of measurement applications to very specific devices for measuring in one environment or application type only. It is common for general purpose types to be programmable; however, many remain as static machines with only a limited number or no changeable parameters. Electronic data loggers have replaced chart recorders in many applications. One of the primary benefits of using data loggers is the ability to automatically collect data on a 24-hour basis. Upon activation, data loggers are typically deployed and left unattended to measure and record information for the duration of the monitoring period. This allows for a comprehensive, accurate picture of the environmental conditions being monitored, such as air temperature and relative humidity. The cost of data loggers has been declining over the years as technology improves and costs are reduced. Simple single channel data loggers cost as little as $25. More complicated loggers may costs hundreds or thousands of dollars.

II. DATA LOGGER VERSUS DATA ACQUISITION

The terms data logging and data acquisition are often used interchangeably. However, in a historical context they are quite different. A data logger is a data acquisition system, but a data acquisition system is not necessarily a data logger. Data loggers typically have slower sample rates. A maximum sample rate of 1 Hz may be considered to be very fast for a data logger, yet very slow for typical data acquisition system. Data loggers are implicitly stand-alone devices, while typical data acquisition system must remain tethered to a computer to acquire data. This stand-alone aspect of data loggers implies on-board memory that is used to store acquired data. Sometimes this memory is very large to accommodate many days, or even months, of unattended recording. This memory may be battery-backed static random access memory, flash memory or EEPROM. Earlier data loggers used magnetic tape, punched paper tape, or directly viewable records such as "strip chart recorders". Given the extended recording times of data loggers, they typically feature a mechanism to record the date and time in a timestamp to ensure that each recorded data value is associated with a date and time of acquisition in order to produce a sequence of events. As such, data loggers typically employ built-in real-time clocks whose published drift can be an important consideration when choosing between data loggers. Data loggers range from simple single-channel input to complex multi-channel instruments. The Simpler device less programming flexibility and some more sophisticated instruments allow for cross-channel computations and alarms based on predetermined conditions. The newest of data loggers can serve web pages, allowing numerous people to monitor a system remotely. The unattended and remote nature of many data logger applications implies the need in some applications to operate from a DC power source, such as a battery. Solar power may be used to supplement these power sources. These constraints have generally led to ensure that the devices they market are extremely power efficient relative to computers. In many cases they are required to operate in harsh environmental conditions where computers will not function reliably. This unattended nature also dictates that data loggers must be extremely reliable. Since they may operate for long periods nonstop with little or no human supervision, and may be installed in harsh or remote locations, it is imperative that so long as they have power, they will not fail to log data for any reason. Manufacturers go to great length to ensure that the devices can be depended on in these applications. As such data loggers are almost completely immune to the problems that might affect a general-purpose computer in the same application, such as program crashes and the instability of some operating systems.

III. DATA ACQUISITION

Data acquisition is the process of sampling signals that measure real world physical conditions and converting the

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resulting samples into digital numeric values that can be manipulated by a computer. Data acquisition systems, abbreviated by the acronyms *DAS* or *DAQ*, typically convert analog waveforms into digital values for processing. The components of data acquisition systems include:

- Sensors, to convert physical parameters to electrical signals.
- Signal conditioning circuitry, to convert sensor signals into a form that can be converted to digital values.
- Stand-alone data acquisition systems are often called data loggers.
- A sensor, which is a type of transducer, is a device that converts a physical property into a corresponding electrical signal (e.g., strain gauge, thermistor). An acquisition system to measure different properties depends on the sensors that are suited to detect those properties. Signal conditioning may be necessary if the signal from the transducer is not suitable for the DAQ hardware being used. The signal may need to be filtered or amplified in most cases. Various other examples of signal conditioning might be bridge completion, providing current or voltage excitation to the sensor, isolation and linearization.

Networking in Data Logger

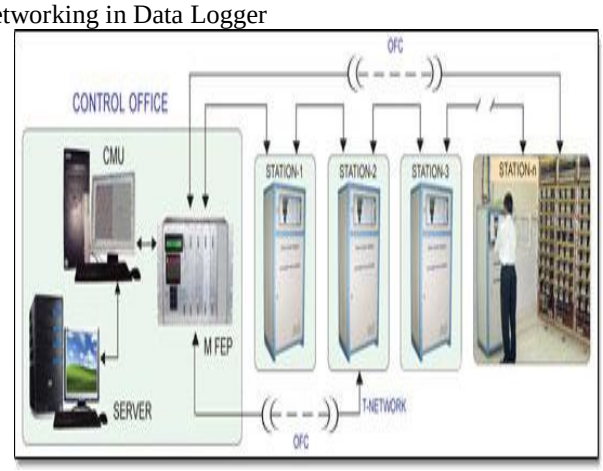

Fig.1. Set up of data logger.

Data Acquisition System

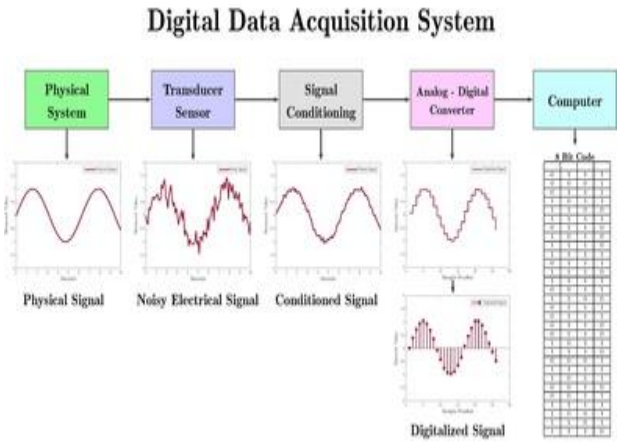

Fig.2. Set up of data acquisition system.

IV. Network Management Of Data Loggers (NMDL)

- Front end application software at central control place
- status of all the data loggers in the network
- Online status of digital/analog inputs
- Data selective viewing
- Online graphical mimic display of every station layout
- Auto backup on exceeding configured size of data base

V. Advantages Of Data Loggers

- Data logger helps in monitoring typical failures such as intermittent, auto right failures
- It helps in analyzing the cause of accidents.
- It helps in detecting the human failure
- Drivers Passing Signal at Danger (SPAD).
- Operational mistakes done by operating staff Signal & Telecom interferences in safety circuits.
- Engineering and Electrical department interferences / failures.
- It helps as a "Diagnostic tool" in preventive maintenance of signaling gears.
- Data loggers can be connected in network. Networked Data loggers help to monitor the PI/RRI/EI remotely
- Failure reports can be generated remotely with help of Data logger network on line and off line track simulation is possible.
- Speed of the train on point zones can be calculated.

VI. Common Equipment For All Data Loggers

Common equipment for all data loggers are given below:

- CPU card.
- Digital and analog input cards.
- Local terminal. (PC)
- Communication links.
- Printer Potential free contacts of relays are used for monitoring digital inputs through Digital scanner cards and AC/DC bus bar voltages are used for monitoring Analog inputs through Analog scanner cards in all data loggers.
- Digital and Analog inputs are connected to the CPU card. The CPU card consists of memory IC's.
- Memory IC's are programmed as per requirement of the signal engineers.
- The data collected by the Data logger can be used for failure analysis, repetitive discrepancies, and for accident investigations.

VII. Operations Of Data Logger

Switch on the power supply switches provided on the rear side of Data logger unit and observe the LCD panel and SIX 7 segment LED display on front view of the DTL.LCD display will show. Efftronics (P) Ltd Networked Data logger System. All the operations (Software) can be performed using the LCD and keyboard. When the data logger is switched on it will be in self-diagnosis mode for some time and finally, a screen similar to the one below will appear. This screen is called "Default Display". Here T, F, D indicates the total records sent from COM Port - 1, total fail records received by COM Port -1, and total pending packets to

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transmit from COM Port1 respectively on first row of LCD display. Similarly for COM Port 2 in second row.

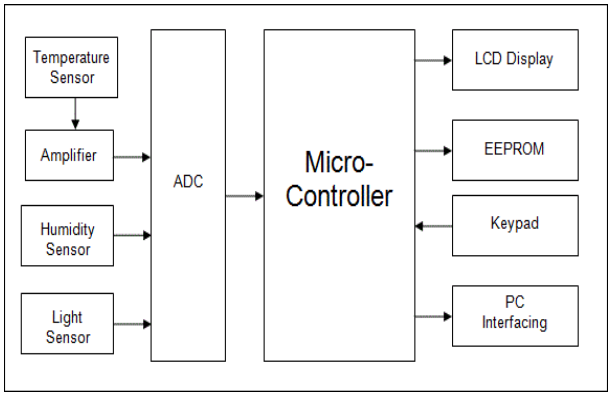

Fig. 3. Data logger set up.

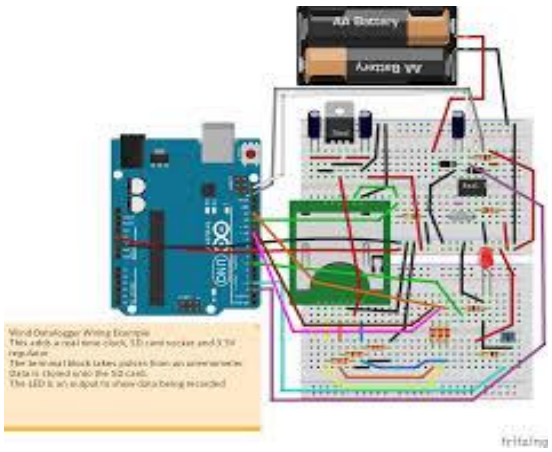

Fig. 4. Internal architecture of data logger.

VIII. Conclusion

With the help of this fastest growing technology we can enhance the skills that are use for the Standardisation of protocols and data formats has been a problem but is now growing in the industry and XML, JSON, and YAML are increasingly being adopted for data exchange. The development of the Semantic Web and the Internet of things is likely to accelerate this present trend.

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