**DESIGN OF ON-LINE INTERACTIVE DATA ACQUISITION AND CONTROL SYSTEM FOR EMBEDDED REAL TIME APPLICATIONS**

**ABSTRACT**

Design of on-line embedded web server is a challenging part of many embedded and real time data acquisition and control system applications. The World Wide Web is a global system of interconnected computer networks that use the standard Internet Protocol Suite (TCP/IP) to serve billion of users worldwide and allows the user to interface many real time embedded applications like data acquisition, Industrial automations and safety measures etc,. This paper approached towards the design and development of on-line Interactive Data Acquisition and Control System (IDACS) using ARM based embedded web server. It can be a network, intelligent and digital distributed control system. Single chip IDACS method improves the processing capability of a system and overcomes the problem of poor real time and reliability. This system uses ARM9 Processor portability with Real Time Linux operating system (RTLinux RTOS) it makes the system more real time and handling various processes based on multi tasking and reliable scheduling mechanisms. Web server application is ported into an ARM processor using embedded ‘C’ language. Web pages are written by Hyper text markup language (HTML); it is beneficial for real time IDACS, Mission critical applications, ATM networks and more.

**INTRODUCTION**

Online Interactive Data Acquisition and Control system plays the major role in the rapid development of the fast popularization and control in the field of measurement and control systems. It has been designed with the help of many electrical, electronic and high voltage equipments; it makes the system more complicated and not reliable. This paper approaches a new system that contains inbuilt Data Acquisition and Control system (DACS) with on-line interaction. It makes the system more reliable and avoids more complication. It is the great demand in consumer applications and many industries. The design of very fast data acquisition in plasma discharge application was discussed in [1]; this system replaces various complexes cables which are used for acquisition and it uses FPGA and ARM processor for data acquisition and digital diagnosis. There are various digital DAC systems are available for the substitution of multisite job operation. A single worker can interact with the machine and collect various data from ongoing work in a single work station. it is the popular choice for many embedded real time applications and PC systems. The design of flexible and networked data acquisition architecture was approached in, where the software resources are stored in local memory to avoid the level of resource usage and increases system’s efficiency. This system process the client based on dynamic manner by server response and it maintains separate data base with DAC controller. In advanced traffic survey mechanism uses data collection process for post processing of vehicle’s position. Signal conditioning is the major part of any data acquisition unit. It allows signals to be conditioned, simultaneously acquired according to the external clock a trigger processed and transferred data to real time servers. In this paper Real time Linux Operating system is ported in ARM9 processor. Generally all ARM9 processors have the portability with any kind of higher end RTOS. This RT Linux RTOS is very effective for many embedded. Here the embedded web server application is developed and ported into ARM9 with this setup. This single ARM board has been act as data acquisition unit, control unit, embedded web server and self diagnosis. All processes are allocated with essential resources and associated with reliable scheduling algorithms and internet protocols followed by ARM processor. This miniaturized setup reduces the complexity & size of system.

**EXISTING SYSTEM**

In the existing system, the industries mostly using DAC & SCADA for live monitoring and data acquisition. In this method industry using DAC for control and monitoring the overall plant. In this idea we can control and monitor the large area of plant even two or more plant can be control by the DAC system. But it require group of member to monitor the plant and control room for the operation. Some time data may vary with real time but the control room doesn’t know it. Most plant is using this type of method. But it is difficult install and monitoring outside the plant. If anything wants to done we have to go to control room. It make it some difficult and uneasy of work. DAC system requires lot of energy to control and monitor the plant.

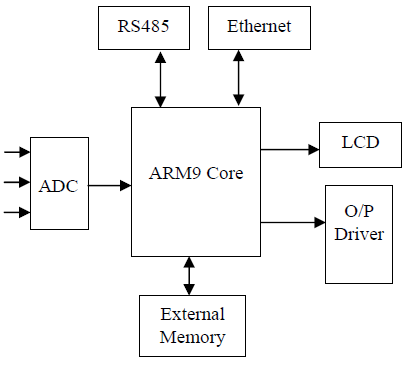
**PROPOSED SYSTEM**

IDACS design is the major part in hardware. ARM9 processor is a centre core of this system. The online intelligent data acquisition and control system based on embedded ARM platform has high universality, each acquisition and control device equipped with 24-way acquisition/control channels and isolated from each other. Each I/O channel can select a variety of electrical and non electrical signals like current, voltage, resistance etc., Digital acquisition are done by special ADC. The measured data are stored in external memory in which the memory is act as a data base during web server mode. The ARM processor directly supports the Ethernet service and RS485 communication. Hence the data has been stored and controlled by some other PCs or network via RS485 &Ethernet. ARM processor has internal I2C module. So it has the ability to communicate with any other peripherals. I2C is the wired communication protocol to communicate with other processor or peripherals thro two wired link. This system has 128\*64 LCD to display the information and measured parameters which makes the debugging and modification of the parameter easy. The Analog to digital interfacing module is independent with the embedded system, which is beneficial to the system maintenance and upgrade. As the embedded Ethernet interface makes the remote data exchange between the applications become very easy. This IDACS system can able to measure the remote signals and can control the remote devices through reliable protocols and communication network. This system uses RT Linux Multi-tasking operating system to measure and control the whole process. And the embedded web server mode requires less resource usage, high reliability, security, controllability and portability.

**PROPOSED SYSTEM ADVANTAGE**

* Embedded ARM system can adapt to the strict requirements of the data acquisition and control system such as the function
* Reliability,
* Cost,
* Size,
* Power consumption,
* Remote access and so on.

**BLOCK DIAGRAM**

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**HARDWARE REQUIREMENT**

* Raspberry PI
* LCD
* Ethernet
* RS485

**SOFTWARE REQUIREMENT**

* Raspbian