Real time JCB monitoring and control system using pic microcontroller

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Abstract:

A JCB is a typical hydraulic heavy-duty human-operated machine used in general versatile construction operations, such as digging, ground levelling, carrying loads, dumping loads and straight traction. In most cases JCB machines are operated by drivers and thus owner of the JCB faces difficulty in monitoring its working time. Implementing a system through which can monitor the JCB machine through an embedded product, where micro-controller is used to monitor working time, client place where work is going on, cost for the working etc., and the same will be sent to JCB owner through mobile phone, customer where work is going on through GSM modem.

Keywords-MP lab IDE; Hi-Tech C compiler; GSM; Express SCH; Proteus.

INTRODUCTION

Basic objective of the proposed system is to monitor & controlling of JCB remotely by using mobile phone. Nowadays, JCB is monitored and controlled manually. It leads to human errors and the owners will face difficulty in monitoring from remote places. Also handling of multiple machines is difficult and the embedded technology can monitor JCB from remote places. It can monitor many machines from one place. It records working time, client place where work is going on, cost for the working etc., and the same will be sent to JCB owner, customer where work is going on through GSM modem. It will be useful to both the customer and the operator. It will give accurate cost of working time.

PROPOSED SYSTEM

PIC microcontroller acts as the heart of the project as shown in Fig.1. It controls the whole system. RTC DS1307 is used to provide the accurate time and date. By using 4x4 Keypad, the customer and operator mobile number can be entered. The entered mobile number is displayed in the 16X2 LCD. A GSM modem is a wireless modem that works with a GSM wireless network. It is used to communicate between the customer and operator. It conveys the total period of working time and cost of work to both the customer and the operator. When the switch is on, the RTC will automatically calculate the time and date and display it in the LCD. By using the keypad, operator and customer mobile number can be entered. If there is any mistake in the mobile number, it can be deleted by using the D key in the keypad. Then, press the A key in the keypad and the message is sent as that the work is started [Fig.2.]. If the operator needs any break during the working time, he has to press the A key. Then, the message is sent as the work is paused for both owner and customer [Fig.3.]. While resume the work the operator has to press the B key. Similarly, the message is sent to both of them that the work is resumed [Fig.4.]. After finishing the work, the operator has to press the C key and this would sent the message as the work is completed and provides the details of the total time of work and cost of the working time for both the owner and the customer [Fig.5.].
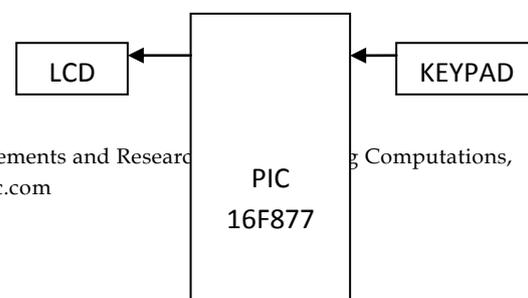
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Fig.1. Block Diagram of Proposed system

SOFTWARE REQUIREMENTS

MP LAB IDE v8.66 MPLAB Integrated Development Environment (IDE) is to integrate toolset for the development of embedded applications employing Microchip PIC microcontrollers. MPLAB IDE runs as a 32-bit application on MS Windows, is easy to use and includes a host of free software components for fast application development and super-charged debugging. MPLAB IDE also serves as a single, unified graphical user interface for additional Microchip and third party software and hardware development tools. HI-TECH C COMPILER translate the source code into object code. The compiler will perform error and syntax checking. The object code is then linked with other object modules to form machine code . PROTEUS 8 is used to simulate and verify embedded programs and it is to create schematics. Proteus 8 is a simulation software for various designs with microcontroller. So it is a handy tool to test programs and embedded designs for electronics hobbyist. EXPRESS SCH is used to design circuit diagrams for the products and it is specifically for drawing schematics.

RESULTS

The Fig 2 indicates that when the switch was ON the working time of the JCB was started and it will calculate the time .This fig 2 shows how the time started and the time is calculating.
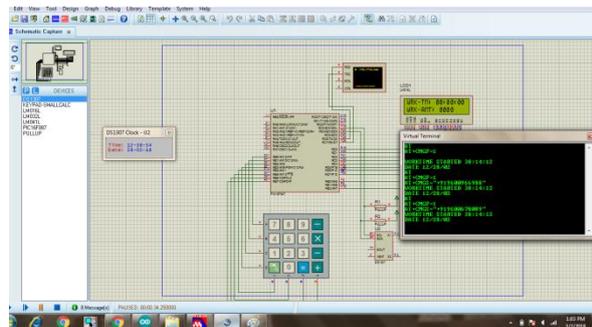

Fig.2.Work time started

The fig 3 indicates the work paused during the process of the work done. In the keypad there will be the button, hence the work can pause the work during the break time this message will be send through GSM to mobile phone to the customer and the owner.
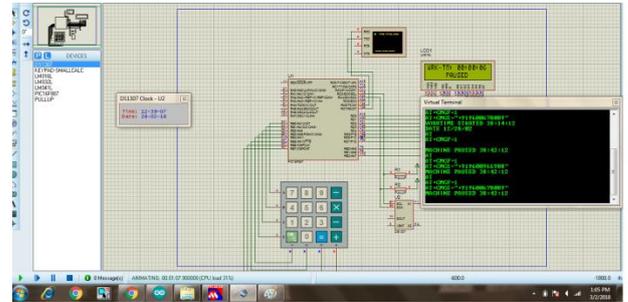

Fig.3.Work Paused

The Fig 4 indicates that work is resumed after the break time or any other circumstances .The work is resumed after pressing the button in the keypad.
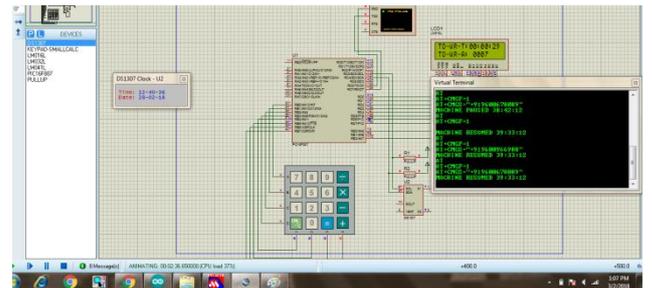

Fig.4.Work Resumed

The Fig 5 indicates that the total work time and the cost of work is calculated. After calculating the work time and the cost that can be send to the customer and the owner through the message.
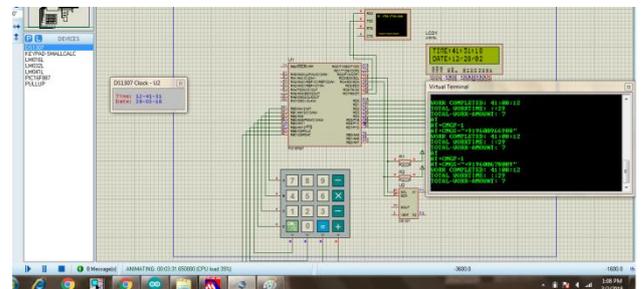

Fig.5.Total Work time and Cost of Work

Thus, this system ensures the total work time and cost of the working time successfully.

CONCLUSION

The system for monitoring and controlling of JCB indicate the status of the work done of the JCB. The controlling and monitoring is done by using PIC microcontroller. It can be widely used in industrial area .In the future, the advance technique of IoT can be implemented in this JCB monitoring and controlling.

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